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DISEASES CAUSED BY BACTERIA AND FUNGI

MURNANE. (1941). **Mastitis.**—*Aust. vet. J.* **17.** 148–150.

M. draws conclusions from five years' study of mastitis in an experimental herd. He draws a distinction between udder infection and mastitis and records his observations. Of 69 cases of *Streptococcus agalactiae* infection only two developed mastitis. There was no mastitis in association with 78 cases of streptococcal (not *Str. agalactiae*) infection, none in 149 cases of micrococcal infection, nine cases of mastitis in 39 of staphylococcal infection, and one case in ten infections by other organisms. The presence of clots or blood in the milk does not necessarily indicate mastitis, neither do " peas " in the teat canals or fibrositis of the udder. High production, large teat orifices, and the feeding of silage were found to have no influence on the occurrence of mastitis, but cold weather and sore teat did sometimes predispose to the condition, and advancing age was associated with a higher incidence. Udder infusion with entozon, acriflavine, or trypaflavine gave good results in early cases only. M. does not suggest control by the removal of infected (*Str. agalactiae*) animals: he has found this infection to appear in a herd of uninfected heifers, to which no animal had been added from outside.—J. E.

—. (Undated). **A Herd Program of Mastitis Prevention and Control conducted Cooperatively by the Dairyman, the Local Veterinarian, and the Extension Service and the Department of Animal Pathology and Hygiene of the College of Agriculture, University of Illinois.** pp. 17. [8vo] [Mimeographed].

A pamphlet explaining a co-operative scheme for farmers, veterinarians, and laboratories for the control of bovine mastitis in Illinois. It follows the usual lines. An " inhibitory-enrichment " solution containing sodium azide, brilliant green, and dextrose is detailed for use in sample tubes to overcome transit and storage difficulties.—C. V. WATKINS.

*HOLMBOE, F. V. (1941). **[Transmission of Mastitis by Flies].**—*Norsk VetTidsskr.* **53.** 314–317. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 217].

Mastitis was set up in cows by placing on their teats house flies " fed " on mastitis excretion. This could be prevented by antiseptic and repellent ointments.

FOLEY, E. J. (1942). **Consise Methods for the Detection of Streptococci of Lancefield's Group B or C in Milk Samples.**—*J. Milk Technol.* **5.** 94–98.

As a reliable yet unelaborate method of laboratory diagnosis for mastitis, F. proposes the use of both the Hotis test and of Edwards' medium, but with modifications as follows. For the Hotis test :– 20 ml. milk added to a tube containing 1 ml. of a solution made of 1 g. sodium azide, 5 g. bromcresol purple, 0·1 g. crystal violet in 1 litre of distilled water. Edwards' medium :– 5 g. lactose, 1 ml. crystal violet sol. (1%), 0·1 g. sodium azide, 1 litre of tryptose phosphate broth (Difco), pH 6·8–7·0.

Advantages claimed for this method and its application are described.—J. E.

SEELEMANN, M. (1942). Ueber die Bedeutung der hämolytischen Streptokokken bei einigen Infektionen des Pferdes. **[Significance of Haemolytic Streptococci in Some Infections of Horses].**—*Dtsch. tierärztl. Wschr.* **50.** 8–12 and 38–41.

The first part contains a discussion of the respiratory diseases of horses in which haemolytic streptococci are regularly isolated, and deals with the role of viruses in these diseases, a comparison being drawn between these and human diseases of streptococcal origin. Details are next given of conditions in a remount depot from May 1940 to April 1941. Of 372 remounts, 235 developed strangles and 140 infectious catarrh. Of the 235 horses that developed strangles, 88 later developed infectious catarrh: 144 horses had uncomplicated strangles. Of those developing infectious catarrh there were only 52 which had not had strangles (during the period at the depot). Only 84 horses remained free of either disease. There were hardly any cases of strangles between January and July; there were very many in August and the following months. Infectious catarrh cases on the other hand had their peak from December to March. Usually there was an interval of 2–3 months before a strangles-infected horse developed infectious catarrh. In the bacteriological investigation, blood-agar plates were streaked with swabs from nasal mucosa, nasal secretion, or from freshly incised strangles abscesses.

All strains of haemolytic streptococci isolated fell into group C. Three subdivisions existed on biochemical grounds, *Streptococcus equi*, *Str. pyogenes animalis* and an intermediate form for which the name *Streptococcus pyogenes-equi* is suggested. *Str. pyogenes animalis* was isolated twice from normal horses, twice from those with a previous history of strangles, once from pneumonia pus, once from infectious catarrh pus, and once from infectious catarrh without pus. *Str. equi* was isolated from ten strangles abscesses and once from nasal secretion of strangles. The intermediate *Str. pyogenes-equi* was frequently isolated from healthy horses, four times from infectious catarrh with no pus, three times from infectious catarrh with rust-coloured

pus, and once from strangles nasal secretion but never from strangles abscesses. *Str. equi* of strangles, on the other hand, was never found on healthy membranes nor in horses recovered from strangles. Moreover, infectious catarrh never preceded strangles but frequently followed it. The biochemical properties possessed by the intermediate *Str. pyogenes-equi* are the production of complete β haemolysis, failure to acidify sorbite, production of slight acid in lactose, ability to grow even on 40% ox-bile blood agar, and slight acidification in litmus milk. It is seen that the bile tolerance distinguishes this intermediate type from the two generally recognized types of group C streptococcus commonly found in horses, and that in other respects its biochemical activities are intermediate.—D. L. ROBARTS.

*BREUER, G. (1941). Die Deckdruse (Geschlechtsdruse). **[Strangles Transmitted by Copulation].**—*Dtsch. Kaltblut.* **14.** 45–48. [Abst. from abst. in *Züchtungskunde.* **17.** 171].

With reference to the theory that stallions can transmit strangles infection by copulation, B. found by many experiments that the semen of infected stallions was not infected by *Streptococcus equi.* He concludes that, if strangles is ever transmitted during copulation, it must be by infection from the stallion's nostrils deposited about the perineum of the mare and perhaps carried into the vagina at copulation.

HARE, T., FRY, R. M., & ORR, A. B. (1942). **First Impressions of the Beta Haemolytic Streptococcus Infection of Swine.**—*Vet. Rec.* **54.** 267–269.

Between 1937 and 1940, the authors isolated β-haemolytic streptococci from 27 pigs, distributed among 12 farms in England. The material examined comprised 13 carcasses, 11 vaginal swabs, 2 tonsil swabs, and 1 swab of mammary exudate. The strains isolated were in 19 cases group C, in three cases group L, in one case group E, in one case group C and group L together, and in three cases they were not typed. Septicaemic, catarrhal, dermatitis, and puerperal syndromes are described. From their clinical and bacteriological findings, the authors consider that they have provisional evidence that there exists in England a hitherto undescribed specific infection of swine due to β-haemolytic streptococci, which is characterized by a high mortality rate in unweaned piglets, and an increased resistance on the part of older pigs. Infection is thought to be spread mainly by the "carrier" sow. Vaccination, curative or preventive, is considered worthy of trial.—E. COTCHIN.

ZITTLE, C. A. (1942). **The Antigenic Structure of Hemolytic Streptococci of Lancefield Group A. VII. Separation of the Protein and Nucleic Acid of the Type-specific M-substance and Some Chemical and Serological Properties of the Purified Type-specific Protein.**—*J. Immunol.* **43.** 31–46. [For previous parts, see *V. B.* **11.** 422].

ZITTLE, C. A., & SEIBERT, F. B. (1942). **The Antigenic Structure of Hemolytic Streptococci of Lancefield Group A. VIII. Electrophoretic Studies of the Type-Specific M-Protein and Other Isolated Fractions.**—*Ibid.* 47–59.

PAPPENHEIMER, A. M., Jr., WILLIAMS, J. W., & ZITTLE, C. A. (1942). **The Antigenic Structure of Hemolytic Streptococci of Lancefield Group A. IX. Some Physical Properties of the M-Protein.**—*Ibid.* 61–63.

ZITTLE, C. A., & HARRIS, T. N. (1942). **The Antigenic Structure of Hemolytic Streptococci of Lancefield Group A. X. The Purification and Certain Properties of the Group-Specific Polysaccharide.**—*J. biol. Chem.* **142.** 823–833.

VII. Type-specific M-substance, obtained in N/20 HCl extracts of group A haemolytic streptococci and precipitated by N.HCl, is about two-thirds protein and one-third nucleic acid.

Repeated precipitation of M substance from solution at pH 7 by neutralized $(NH_4)_2SO_4$ reduced the P content from 3% to about 0·1%. The M protein so obtained had the peculiar property of increased solubility in water with increase in temperature. Serological studies indicated non-reactions with purified protein material from different strains, but no precipitin reaction with group-specific antiserum which reacted with $1{\cdot}2 \times 10^4$ dilutions of purified group-specific polysaccharide.

Evidence is presented that protein and nucleic acid of the M substance are in salt-like combination, and that the M protein may be part of the cell wall.

VIII. Electrophoretic examination confirmed the fact that M substance contained "free" nucleic acid, *i.e.* present as protein-nucleate, that M protein was homogeneous, and that NPA fraction [see *V. B.* **11.** 422.] contained a protein differing from M protein.

IX. Measurement of sedimentation velocity, diffusion constants and viscosity of type-specific M substance indicated a molecular weight of 41,000, high viscosity in solution, and an elongated molecule.

X. The group-specific polysaccharide was isolated from acid-extracted organisms by the formamide method of FULLER [*V. B.* **8.** 742.] and purified by Lloyd's reagent and by fractionating at varying pH. The resultant product was reactive in 1 : 2,000,000 dilution with specific antisera, contained 1·7% N (mostly glucosamine N) and 0·7% P (apparently not nucleic acid), and had a reducing value (as glucose) of 87·2%.
—J. LOCHIEL MCGIRR.

MILSTONE, H. (1941). **A Factor in Normal Human Blood Which Participates in Streptococcal Fibrinolysis.**—*J. Immunol.* **42.** 109–116.

It is claimed that fibrinolysin of group A streptococci does not exert its characteristic rapid action on human fibrin if the fibrin is sufficiently pure. Fibrinolysis can be effected by a lytic factor present in the euglobulin fraction of normal human serum. This factor is absent in rabbit serum, but rabbit fibrin can be sensitized to fibrinolysin by the addition of the human lytic factor. The latter is distinct from thrombin and fibrinogen. Details are given of materials and methods.—D. L. ROBARTS.

NICHOLSON, T. F., & HOLMAN, W. L. (1942). **Carbohydrate Metabolism and Staphylococcus Infection in Rabbits.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 75–77.

Six rabbits were twice injected intradermally with massive doses of *Staph. aureus*, three weeks elapsing between injections. A further six were treated similarly, first with 2 ml. of 1 : 20 dilution of *Staph. aureus* toxin, and after three weeks with 2 ml. undiluted toxin. A definite and permanent reduction in carbohydrate tolerance was produced with curves similar to those seen in mild diabetes.—ALEX. B. PATERSON.

KNAYSI, G. (1942). **The Demonstration of a Nucleus in the Cell of a Staphylococcus.**—*J. Bact.* **43.** 365–385.

Chemical and morphological studies were made of a staphylococcus forming greenish-black colonies. A resting phase of the cell usually containing a single granule is described. Karyokinesis and subsequent cytokinesis were observed. Actively growing cells contained 2–4 granules of shapes indicating elongation and division. Chemically the granules stained with methylene blue at low pH (1·8–2·0), were insoluble in boiling water for 10 min., gave the Millon and the Sharp tests for protein, and a positive Feulgen reaction. The granules did not give microchemical tests for fat or

glycogen and were not used up by starving cells, indicating that they are not reserve material. The granules were considered to be nucleoprotein and also, morphologically, of nuclear nature.—D. L. ROBARTS.

TERENT'EV, F. A., & UZOROVA, V. D. (1939). O primenenii pervoĭ vaktsiny Tsenkovskogo dlya predokhranitel'nykh privivok protiv sibirskoĭ yazvy. **[Use of the First Vaccine of Tsenkovskiĭ for Preventive Inoculation against Anthrax].**—*Sovyet. Vet.* No. 5. pp. 35–36.

Basing their investigations on the work of RAMON and others, the authors re-tested TSENKOVSKIĬ'S first vaccine. They increased the usual concentration of spores 15–25 times and added agar + potassium alum or lanolin + sunflower oil to the original vaccine.

Out of 46 vaccinated and subsequently infected laboratory animals, 18 remained alive. Of four vaccinated and subsequently infected sheep, three remained alive. All the controls died.—E. MARTIN.

TERENT'EV, F. A., & UZOROVA, V. D. (1939). Protivosibireyazvennye privivki s.-kh. zhivotnykh 1-ĭ vaktsinoĭ Tsenkovskogo. **[Inoculation of Domestic Animals against Anthrax with Tsenkovskiĭ's First Vaccine.**—*Sovyet. Vet.* No. 12. pp. 27–29.

Experiments were continued [see preceding abst.] with Tsenkovskiĭ's spore vaccine, alone and with the addition of substances which delay the resorbtion of antigen, such as 0·2% agar and 1% alum solution used together, agar and alum used separately, and aluminium hydroxide. The vaccine proved avirulent for g. pigs, rabbits, and sheep. In sheep, a solid protection, lasting about five months, was established 7–14 days after vaccination. The vaccine may be used for emergency vaccinations when the animals are exposed to the risk of infection.—A. MOLDAWSKY.

HEASLIP, W. G. (1941). **Bacillus Tropicus, a New Species Isolated from Man and Animals Described and Compared with other Bacilli Resembling Bacillus Anthracis.**—*Med. J. Aust.* Nov. 8th. 536–540.

H. gives details of the morphology, cultural characters, serology and pathogenicity of *B. tropicus*, previously described as the probable cause of coastal fever in man in Queensland. It is compared with, and is possibly a variant of, *B. anthracis*. A summary and bibliography are given of infections of man and animals with anthrax-like bacilli, including *B. subtilis*.—A. W. BANKS.

COHRS, P. (1941). Zur Differentialdiagnose der Miliartuberkulose. **[Differential Diagnosis of Miliary TB.].**—*Z. Fleisch- u. Milchhyg.* **51.** 141–143.

In the new regulations for meat inspection, issued in October, 1940, a definition of acute, miliary TB. is given. Simultaneous presence of tuberculous lesions in the lungs and kidneys is regarded as proof of haematogenous distribution of the bacilli. In the calf, ox, pig, sheep, goat, cat, and dog acute, haematogenous, miliary TB. usually develops during early generalization. In adult cattle, the condition mostly follows late generalization, and is characterized by its tendency to dry caseation with petechial haemorrhages. In horses, acute miliary TB. develops towards the end of the early generalization, the latter condition being characterized by the presence of sarcoma-like nodules in the spleen, lymph nodes and other organs, together with bacon-like infiltration of the lung; months or even years later fatal, acute, miliary TB. develops. A detailed account is given on the macroscopic findings and of differential diagnosis of miliary TB. in different animals.—E. WEISSBERG.

HENDERSHOTT, R. A., & JOHNSTON, C. B. (1942). **The Value of Blood Examinations in the Diagnosis of Bovine Tuberculosis.**—*Proc. 45th Meet. U.S. Live Stk sanit. Ass., 1941.* pp. 157–169.

A study was made of the leucocytic formula of normal cattle and tuberculin test reactors prior to and 24 hours after subcutaneous injection of 2 ml. of tuberculin. In a series of 2,313 blood smears it was found that, following the injection of tuberculin, in nearly every animal which was infected with TB., there was a marked increase in the number of neutrophiles and a corresponding decrease in the number of lymphocytes. The method was applied to 12 herds in New Jersey suspected of containing tuberculous animals. Of 695 animals studied, 159 showed these leucocyte changes. Seventy-three of these were positive and 86 negative to the tuberculin test. Of the above 159, 125 showed tuberculous lesions on autopsy, 13 failed to show lesions, and 21 were not slaughtered. Nine of the 13 animals which failed to show lesions were negative to the tuberculin test; the other four reacted. Of the 73 animals positive to the tuberculin test, 69 showed lesions of TB. on autopsy and four failed to show lesions. Of the 86 animals which showed these leucocyte changes and were negative to the tuberculin test, 56 showed lesions on autopsy, nine failed to show lesions and 21 were not slaughtered.

According to these preliminary results the method is a valuable adjunct to diagnosis by tuberculin tests and is worthy of extended trial.—D. D. OGILVIE.

I. *POSTMA, H. (1941). **[Possibilities of a General Campaign against Bovine TB. in Holland].**—*Tijdschr. Diergeneesk.* **68.** 132–134.

II. *AUKEMA, C. (1941). **[Directions for Bovine TB. Control, Especially in Groningen (Holland)].**—*Ibid.* 135–141.

[Translation of absts. in *Wien. tierärztl. Mschr.* **29.** 208].

I. Forty years' experience has shown that control cannot be achieved by measures dependent upon voluntary participation. For successful control legalized obligatory measures under exclusive veterinary guidance must be operative.

II. A. writes to the same effect.

BELLER, K., & LATSCHAR, A. (1941). Untersuchungen über Ziegentuberkulose. III. Die Bedeutung der Ziegentuberkulose in Oberhessen und ihre Feststellungsmöglichkeiten. **[Research on Caprine TB. III. Caprine TB. in Upper Hessen and its Detection].**—*Arch. wiss. prakt. Tierheilk.* **77.** 104–118. [For previous parts, see *V. B.* **12.** 402].

The authors examined all goats in two districts in Hessen for evidence of TB., using clinical, allergic, and complement-fixation tests, and bacteriological methods [see part II]. 211 goats were so examined and 14 reacted to the tuberculin test, of which five reacted serologically, whilst ten of 61 doubtful allergic reactors were serologically positive. Three other goats were allergically negative and serologically positive. It was not possible to check these figures by P.M. examination. Thus the total TB. incidence was difficult to assess with certainty.

There was a rather wide discrepancy between the results of allergic and serological tests, the reasons for which are discussed. The tuberculin test is regarded as the more accurate, though complement fixation is a useful adjunct. The milk of every lactating goat was examined culturally and all were negative. It was impossible to determine the type of infection in the tuberculous goats, as they were not available for the necessary suitable examinations.—J. E.

*HOLTH, H., & PRAG, K. F. (1941). Weitere Untersuchungen über die Bazillentypen bei der Schweine-

tuberkulose. **[Further Work on the Type of Tubercle Bacilli in TB. in Swine]**.—*Norsk VetTidsskr.* **53.** 176–186. [Abst. from abst. in *Tierärztl. Rdsch.* **48.** 32].

Past work by H. has shown that the avian, human, and bovine types of tubercle bacilli (incidence in that order) are concerned in porcine TB. in Norway. The coccobacillus described by H. occurs in about one-quarter of all cases of tuberculous-like lesions in swine. H. appears to disagree that this coccobacillus is *Corynebacterium equi*, as has been stated by Danish workers. In 1939 and 1940, 360 lymph node samples were culturally tested: avian type tubercle bacilli were isolated from 195, human type from seven, bovine type from six, and the coccobacilli from five.

OTTOSEN, H. E. (1942). **Histological Studies on Tuberculosis of Bones in Swine.**—*Skand. VetTidskr.* **32.** 65–77. [In English].

This work was undertaken to clarify some doubtful points on the histopathology of TB. in swine, particularly on the presence or absence of giant cells. O. examined 25 cases of TB. of the vertebrae or ribs in swine and found that giant cells were rarely seen and that the general histological picture was unusual for TB. lesions in general. It comprised lobulation with a central congregation of leucocytes with a peripheral accumulation of epitheloid cells. In one instance, O. observed club formation reminiscent of actinomycosis. Caseation was present in one-third of the specimens.
—G. B. BROOK.

*VAN DER HOEDEN, J. (1941). **[Avian Type TB. in Mammals]**.—*Tijdschr. Diergeneesk.* **68.** 335–349. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 211].

A review of the position in Holland. Out of nearly 1,000 cases of human TB. which were type tested, 842 were due to human type, 72 to bovine type, and none to the avian type of tubercle bacilli: in swine 113 were due to bovine and 56 to avian type bacilli and in cattle 133 were due to bovine and four to avian type. Avian type infection only causes local (usually lymph node) TB. in pigs, but in cattle it has been found to be associated with advanced miliary TB. Avian type TB. was found in two out of 17 cases of TB. in goats [remainder presumably of bovine type] and caused severe lesions. Out of 14 cases of TB. in horses two were due to avian type, in one of which there was miliary TB. of the lungs and a very severely tuberculous liver, and in the others there was diffuse TB. in the lungs with caseous tubercles in the spleen and kidneys. Avian type bacilli have not been isolated from tuberculous carnivora.

Rabbits and mice are said to be very susceptible to avian type infection. The author suggests that rodents may perhaps spread TB. among poultry.

NÓBREGA, P., & REIS, J. (1941). Tuberculose em coati (Nasua narica) determinada pelo bacilo do tipo bovino. **[Bovine Type TB. in a Coati** (*N. narica*)**]**.—*Arq. Inst. biol., S. Paulo.* **12.** 303–305. [English summary].

A case is reported of TB. in a coati which was already ill when captured. Bacilli isolated from the peritoneal fluid and from the lungs proved to be of bovine type.—MILLER WATSON.

KENNARD, M. A., & WILLNER, M. D. (1941). **Tuberculosis and Tuberculin Tests in Subhuman Primates.**—*Yale J. Biol. Med.* **13.** 795–812.

A general review is given of the literature on the subject. It is noted that the incidence of the disease has always been high among monkeys and anthropoid apes in captivity. The authors made observations, over a period of ten years, on a large colony of these animals kept for the use of the Yale University School of Medicine; about 25% of more than 2,000 animals used were infected. Most of the animals were brought in with the disease; some contracted it in the colony. The disease proceeds rapidly and runs a fatal course within a few months; apparently no immunity sufficient to arrest the disease is developed. There is greater evidence for air-borne infection than for infection by ingestion, as contact between cages is impossible in this colony. Clinical and P.M. diagnoses are discussed.

Routine tuberculin tests were made, over a period of two years, of all monkeys in the colony. Subcutaneous inoculation of Old Tuberculin was made into the upper eyelid, the dose used being either 1·0 or 10·0 mg. in 0·1 ml. saline. Tests were read for three successive days after injection, redness and oedema, or, in extreme cases, suppuration of the eyelid being regarded as positive indications. 380 monkeys were tested with tuberculin; of 269 autopsies, the P.M. findings and the results of the test agreed in 227, or 85% of cases. Forty-eight (65%) of 74 animals shown P.M. to be infected, had given positive reactions, 26 having given negative reactions. Of 195 monkeys found negative at autopsy, 179 (90%) had given negative reactions and 16 positive reactions. It is concluded that strongly positive reactions indicate the presence of infection, but that less strong ones are sometimes false. The danger is stressed of severely affected animals' giving a negative reaction; ten of the 26 affected cases which gave negative reactions, showed severe infection at autopsy. In a few cases there were changes in the extent of the tuberculin reaction of individuals in the series of tests made.

The incidence of TB. in the colony was reduced by the use of the tuberculin test; the percentage of animals showing TB. at autopsy dropped from 30 in 1938 to 24 in 1940, and the number dying from TB. decreased from 17·8% to 4·7%.

BELLER, K. (1941). Der Nachweis des Typus bovinus bei Lupuserkrankungen und anderen tuberkulösen Prozessen des Menschen. **[Demonstration of the Bovine Type Tubercle Bacillus in Human Lupus and other Forms of TB. in Man]**.—*Zbl. Bakt. I.* (*Orig.*). **148.** 118–124.

Using cultural and where necessary biological tests, B. found that 20% of 144 strains of tubercle bacilli isolated from cases of lupus were of the bovine type.
—JOHN FRANCIS.

HAEFLIGER, E. (1939). Über die Ausbreitungsgeschwindigkeit intrakutan verimpfter Tuberkelbazillen im Körper von Meerschweinchen, die mit abgetöteten Bazillen in Vaselinöl vorbehandelt waren. **[The Rate of Spread of Tubercle Bacilli in the Bodies of G. Pigs Previously Treated with Killed Bacilli in Vaseline Oil]**.—*Z. Tuberk.* **82.** 91–101.

Subcutaneous inoculation of g. pigs with heat-killed organisms in vaseline was superior to inoculation with killed organisms in saline, but not as effective as that with live attenuated organisms, in respect of immunity produced and spread of subsequently inoculated live organisms in g. pigs.—J. LOCHIEL MCGIRR.

BATTIGNANI, C. (1941). Sulla differenziazione dei BB. tubercolari umano, bovino ed aviario mediante l'inoculazione del topolino. **[Differentiation of Human, Bovine, and Avian Types of Tubercle Bacilli by Mouse Inoculation]**.—*Ann. Igiene* (*sper.*). **51.** 747–760.

Experiments with large numbers of mice and with two strains each of bovine, human and avian types of tubercle bacilli showed that mice are of value in differentiating mammalian and avian TB., being relatively

much less susceptible to the latter, but equally susceptible to bovine and human type infection.—J. E.

*SCHÖNE, S. (1941). Zur Frage der Typendifferenzierung fortgezüchteter Tuberkelbakterienstämme. **[Type Differentiation of Tubercle Bacilli which have been Cultured for a Long Time].**—*Inaug. Diss., Leipzig.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 470–471].

Glycerin broth has proved useful for the differentiation of old cultures of mammalian and avian tubercle bacilli which have lost their distinguishing characters after long culture on egg media. In glycerin broth such old mammalian cultures rapidly form a strong surface growth which develops crevices and climbs up the glass wall. Avian type bacilli merely form a thin flat oily surface colony. Behaviour of these types of bacilli on other media is also described.

ZEYLAND, J., & PIASECKA-ZEYLAND, J. (1940). **Antituberculous Immunity Produced by BCG Vaccine.**—*Acta paediatr., Stockh.* **27.** 393–401. [In English]. [Abst. from abst. in *Amer. Rev. Tuberc.* **44.** p. 105 of absts.]

In experiments on 50 g. pigs, BCG was found to prolong the survival time after virulent infection fivefold as compared with that of unvaccinated, infected controls. The rest of the article concerns the use of the variant on 450 children, the results being comparable with those in the g. pigs.

*SCHAEFER, W. (1940). Recherches sur la spécificité des protéides des bacilles tuberculeux. Identification sérologique des souches bovines et sérodiagnostic de la tuberculose bovine chez l'homme. **[Specificity of Proteins of Tubercle Bacilli. Serological Identification of Bovine Type Strains and of Bovine Type Infection in Man].**—*Ann. Inst. Pasteur.* **64.** 517–541. [Abst. from abst. in *Zbl. Bakt. I. (Ref.).* **140.** 148].

Previous work suggests that protein fractions are only antigenic by virtue of their carbohydrate content. Using a smooth bovine strain and working with antisera from horses and rabbits, S. demonstrated the presence of an antibody reacting with tuberculin protein. The lipoid and carbohydrate antibodies produced were not specific, while the antibody to the protein material was found to be strictly specific.

Human subjects with bovine-type infection showed a bovine-type antibody in the serum, while with human-type infection only traces of this antibody were present, although carbohydrate and lipoid antibodies common to both human and bovine-type infections showed up in considerable amounts.

In the g. pig infected with bovine-type bacillus, lipoid, carbohydrate and protein antibodies were present in the serum, although these last were not as strictly specific as with similar antisera derived from man, horse and rabbit. In the g. pig a common antibody for human and bovine organisms was produced which did not react with avian-type organisms.

S. concludes that two different types of antibody are produced by the bovine-type bacillus (1) specific for the bovine type, and (2) common to both human and bovine types, and only found so far in the g. pig. In the conversion from S to R variant the protein antigenicity is lost, while the other antigenic qualities are not affected.—J. LOCHIEL MCGIRR.

MINETT, F. C. (1942). **The Diagnosis of Johne's Disease of Cattle by Cultural Methods.**—*J. Path. Bact.* **54.** 209–219.

An attempt was made to ascertain the best method for isolating small numbers of Johne's bacilli from animal tissues.

Falling tenfold dilutions of six recently isolated strains of *Mycobacterium johnei*, or of infected intestinal mucosa were used in the various tests. With the former, growth usually occurred with dilutions as high as 10^{-5}–10^{-7} and with the latter 10^{-4}–10^{-6}.

Intestinal mucosa from the terminal part of the ileum, the ileocaecal valves, or mesenteric lymph nodes is the predilection site for bacilli. Pre-treatment with NaOH, H_2SO_4, HCl, and antiformin was tried and exposure to a final concentration of 10% antiformin was found to be the best. Material was seeded at intervals by the direct loop method and finally from centrifuged washed deposits after 30 min. at laboratory temperature. Pre-treatment of material with trypsin or papain did not yield good results.

A large number of culture media was tested for their ability to support the growth of small numbers of Johne's bacilli in primary culture. Those with whole egg alone as a basis, plus 4% of glycerol and about 1% of *phlei* extract, were decidedly better than similar media containing agar. Solid serum and potato media were not satisfactory. The best results were obtained when the egg tissue was diluted with liver extract, particularly if prepared from horse liver. Normal saline gave poor results when used as a diluent; Löwenstein's or Lockemann's fluid, and potato or veal broth gave moderate results.

The pH of egg media should be about 6·3. In tests of the value of adding various dyes to the media, it was found that brilliant green or malachite green (0·03–0·04%) could be added with advantage but that gentian violet (0·01%) was inhibitory and that the addition of potassium tellurite or penicillin was not beneficial.—JOHN FRANCIS.

POSOKHIN, E. G. (1940). K voprosu epizootologii paratuberkuleznogo enterita krupnogo rogatogo skota. **[Epizoology of Johne's Disease in Bovines].**—*Sovyet. Vet.* No. 11/12. pp. 11–14.

A report on a herd affected with Johne's disease. The disease was probably introduced into the herd during 1932–33 by latent carriers. The first test (subcutaneous) was made in 1935 on 1,108 cattle, avian type tuberculin being used; there were 15 reactors, and 16 doubtful reactors: there were also three clinically affected animals. The clinical cases were eliminated and the reactors and those giving doubtful reactions were isolated. In the following year, 1,987 cattle were tested, revealing one positive and two doubtful reactors; there were also five clinical cases, four of which had developed clinical symptoms only a few months after they had reacted negatively in the previous year.

The reactors were mainly in the 2–6 year age group and the clinically affected in the 6–10 year group.

Mycobacterium johnei could be detected in the faeces of all clinically affected cattle, in 30–50% of reactors, and in 20% of those with doubtful reactions. In accordance with the new regulation of 1940, ten reactors were submitted to the intradermal test using avian tuberculin, and johnin prepared by the All-Union Institute for Experimental Veterinary Medicine. P. points out the advantages of the intradermal test, especially with johnin, which gives fewer doubtful reactions than avian tuberculin.

The results of the P.M. examination of ten reactors are given.

Johne's disease occurred on the same farm in sheep on infected pastures. Two out of 98 sheep gave positive reactions to complement-fixation tests; one was clinically affected (emaciation, anaemia), and the other showed no symptoms, and both reacted to avian tuberculin and johnin.—A. MOLDAWSKY.

BORODENOK, A. I. (1941). Pato-morfologicheskie izmeneniya v organakh i obsemenyaemost' slizistoĭ kishechnika palochkoĭ ione pri paratuberkuleznom enterite krupnogo rogatogo skota. [**Pathological Changes in the Organs and Dissemination from the Intestinal Mucosa of the Bacillus in Johne's Disease in Cattle**].—*Veterinariya, Moscow.* No. 3. pp. 62–67. [French summary].

Pathological-anatomical and histological studies were made in 30 animals in the advanced and early stages of Johne's disease. In animals with typical clinical and P.M. changes (usually negative reactors to the avian tuberculin test), the distribution of bacilli along the mucous membrane was abundant but not regular; in early infection where the clinical features were not pronounced and P.M. changes were similar to those of simple catarrhal inflammation, the bacilli were scarce. For diagnosis it is therefore recommended that the mucus be collected from several sites.

Besides the usual localization, lesions were present in two cows in the gall bladder, portal lymph nodes, and spleen. The changes in the gall bladder of one of these animals were identical with those observed in the intestines in advanced cases; in the other animal the changes were of a more acute character, showing enlargement, thickening, hyperaemia, and petechial haemorrhages.

B. stresses the necessity of histological examinations in the study of the pathogenesis of Johne's disease.
—A. MOLDAWSKY.

BAARS, G. (1941). Ueber Paratuberkulose des Schafes. [**Johne's Disease in Sheep**].—*Tierärztl. Rdsch.* **47.** 498–499.

Johne's disease of cattle is well known in Germany, but the disease in sheep is seldom reported. B. studied an outbreak in a large herd and describes the clinical symptoms and P.M. lesions. [A detailed account of Johne's disease in sheep has been given by MCEWEN—*V. B.* **10.** 323.]—JOHN FRANCIS.

EVELETH, D. F., GIFFORD, R., & ANTHONY, C. H. (1942). **Johne's Disease of Sheep.**—*Vet. Med.* **37.** 241–247.

The authors consider that Johne's disease seldom, if ever, occurs as an uncomplicated condition in sheep and where feeding and flock management are good the disease may exist undetected. The vague and irregular symptoms make diagnosis on clinical grounds somewhat difficult. Intermittent scouring, loss of wool, and a reduced lamb crop may be the only abnormalities, and may be produced by parasites or organisms other than *Mycobacterium johnei.*

Patchy and streaky inflammation of the abomasum or intestinal tract, together with oedema of the submucosa, are to be found in typical cases of Johne's disease, but diagnosis should depend on the finding of acid-fast organisms in the inflamed areas. Several cases are recorded in which the intestinal wall was not only thickened but actually corrugated as in the case of the bovine animal.

The caudal fold johnin test gave good results, but was not sufficiently reliable for purposes of complete control. The nature and size of the swelling was recorded at the 72nd hour, the positive reaction showing generally a large, hot, and painful swelling.

The authors refer to the intercommunicability of the disease amongst domestic animals and consider that the pig may act as a carrier without succumbing to infection.

The clinical appearance, P.M. lesions, and the results of the johnin test are illustrated.—N. S. BARRON.

CUMMINS, S. L. (1942). **Urea and its Effect on Tubercle Bacilli.**—*Brit. med. J.* May 16th. 609.

The experiment described indicates that urea in dilution of half-saturation and one-fourth saturation completely kills tubercle bacilli from a thick emulsion in 48 hours. Since urea in the pure state or in saturated solution is harmless to the tissues, and not only kills tubercle bacilli in very large numbers but also destroys septic secretions and saprophytic organisms, C. suggests its use as a dressing for tuberculous ulcers. Where crystalline urea is being used, it should be protected from absorption by the interposition of oiled silk between the urea and the dressings.—J. LOCHIEL MCGIRR.

EDEN, A., & GREEN, H. H. (1941). **Chemical Changes Occurring during the Growth of Various Acid-fast Bacteria in Synthetic Media.**—*Vet. J.* **97.** 315–329.

Chemical changes occurring during growth of three strains of human, one strain of avian and one of bovine type *Mycobacterium tuberculosis*, two of *M. johnei* and one of *M. phlei* were studied in synthetic media of asparagine-glycerol type. Growths corresponding to bacterial dry weight up to 1·9 g. per 100 ml. medium were obtained with the human strains, 2·7 g. with the avian, 1·2 g. with the bovine and with the *M. johnei* strains, and 1·6 g. with *M. phlei.* In every case there was a steady increase in the biologically active water-soluble, non-heat-coagulable protein, the final yield after about eight weeks ranging from 0·15 g. per 100 ml. medium in the human strains to one-third of this value in the bovine and avian strains. Intermediate figures for protein were given by *M. phlei* and by *M. johnei*, both of which gave values of about half those of the human strains. The principal chemical changes in the medium during the growth of the human strains were the rapid disappearance of dextrose and amide-nitrogen, heavy production of ammonia, and extensive utilization of glycerol. The bovine strain because of its lower tolerance to glycerol, was grown in medium containing 6% instead of 10%. In this case the glycerol was less effectively utilized, although dextrose and amide-N in the medium diminished rapidly. Emphasis is laid on the value of protein determinations on the bacteria-free filtrate, for the selection of strains for diagnostic use, and for estimating the potency of the final products.
—J. P. GARDNER.

CABASSO, V. (1941). Sur diverses souches de bacilles acido-résistants paratuberculeux saprophytes. Contribution à l'étude des bacilles acido-résistants. [**Observations on Saprophytic Acid-Fast Paratubercle Bacilli**].—*Arch. Inst. Pasteur Tunis.* **30.** 26–54 and 165–202.

Saprophytic acid-fast bacilli were isolated from different sources such as faecal material, soil, tap water, cereals etc. They were submitted to a detailed cultural, biochemical, and serological examination.

Aqueous suspensions were completely non-pathogenic for g. pigs and mice, but when the organisms were taken up in liquid paraffin they produced widespread lesions which were often fatal. This effect was also seen with dead bacilli in oil. C. suggests that the oil extracts a lipoidal substance from the organism which forms a protective membrane and thus provides a barrier against leucocytes.

Several of the strains were grown in Sauton's medium and the liquid examined for tuberculin-like substances. It is stated that one strain produced a tuberculin which was as active as Old Tuberculin. [The evidence is not very convincing, since it is based on the observation that a 1 : 10 dilution produced a dermal reaction in sensitized g. pigs equal in intensity to a reaction to a similar dilution of O.T.]

Some of the liquids which gave a positive xanthoprotein reaction [used as an indicator of tuberculin content—see VAN DEINSE (1939). *C. R. Soc. biol. Paris.* **206.** 358.] were completely free from tuberculin.

Details are given of the metabolic activity of these strains in respect of change in pH, protein and fat formation, etc.—R. E. GLOVER.

MCDONALD, I. W. (1942). **A Note on the Occurrence in Australia of *Corynebacterium equi* in Pigs.**—*Aust. J. exp. Biol. med. Sci.* **20.** 27–29.

From lesions resembling TB. in the lymph nodes of pigs, an organism apparently identical in cultural and morphological characters with *C. equi* was isolated. The lesions closely resembled those described by Scandinavian workers [see *V. B.* **7.** 54; **9.** 291, and **11.** 77].
—A. W. BANKS.

STRELKOV, N. M. (1940). Reaktsiya na mallein konepogolov'ya malleinovykh raïonov. [**Mallein Tests on Horses in Districts Where Glanders is Endemic**].—*Sovyet. Vet.* No. 11/12. pp. 22–26.

An account of comparative "ophthalmo" mallein on 871 and subcutaneous tests on 81 horses with the results of the *post-mortem* examination of nine of them. Certain discrepancies were found. No new information is provided.—A. MOLDAWSKY.

JULIANELLE, L. A. (1941). **The Identification of Erysipelothrix and its Relation to Listerella.**—*J. Bact.* **42.** 385–394.

In this study, 13 strains of *E. rhusiopathiae*, and two strains of *Listerella* (representing the two serological types) were investigated. All *Erysipelothrix* strains fermented glucose, lactose and *d*-laevulose without production of gas. About half the strains formed acid in galactose. The lack of motility of *Erysipelothrix*, its inability to ferment mannose, rhamnose, maltose, salicin, and sucrose, and its failure to elicit the corneal reaction characteristic of *Listerella*, served to distinguish it from the latter. The methyl red and V.P. tests were negative with *Erysipelothrix*, and positive with *Listerella*.

Inoculation of *Erysipelothrix* culture into the conjunctiva of rabbits by gentle swabbing, was sometimes followed by infection, but in these cases, septicaemia and death invariably resulted. The ocular reaction produced by *Listerella* was never followed by death.

Erysipelothrix strains were found to constitute a single immunological group, as judged by the agglutination test, and to be distinct serologically from the *Listerella* strains.—ISOBEL W. BURTON.

PALLASKE, G. (1940). Ueber das Vorkommen einer seuchenhaften Encephalomyelitis purulente bei Schafen in Deutschland. (Listerella-Infektion). [**The Occurrence of Purulent Encephalomyelitis (Listerella Infection) in Sheep in Germany**].—*Berl. Münch. tierärztl. Wschr.* Sept. 13th. 441–445.

P. describes an outbreak of listerella encephalomyelitis in sheep in the district of Grenz-Neumark and Lausitz in Germany. In all respects the condition resembled that reported by GILL in New Zealand and PATERSON in England.—E. WEISSBERG.

PALLASKE, G. (1941). Listerella-Infektion bei Hühnern in Deutschland. [**Listerella Infection in Fowls in Germany**].—*Berl. Münch. tierärztl. Wschr.* Sept. 12th. 441–445.

This paper deals with the first recognized cases of listerella infection amongst fowls in Germany. P.M. findings in naturally and experimentally infected birds agreed with those described by SEASTONE [*V. B.* **6.** 106.], the typical extensive necrotic lesions in the myocardium being the main feature. Smaller foci in the liver and a consolidation in one of the lungs are also found in the natural cases. In experimentally infected birds the pericardium is also involved and filled to distension with a more or less clear fluid, while in most cases the epicardium is covered with a fibrinous coat increased in thickness at the base of the heart. A detailed description is given of the histological examination, cultivation of the organisms, and the reaction of mice, g. pigs, and rabbits to experimental infection.

P.'s strain, however, unlike those of SEASTONE does not ferment rhamnose.—T. BAKKER.

SAVINO, E., & VILLAZON, N. M. (1941). Estructura del antígeno ciliar de *Listerella monocytogenes*. [**Structure of the Flagellar Antigen of *L. monocytogenes***].—*Rev. Inst. bact., B. Aires.* **10.** 127–134.

Using five strains of *L. monocytogenes* the authors studied the structure of the flagellar antigen. The strains were (a) that isolated by MURRAY *et al.* (1926) of rabbit origin, (b) a human strain isolated by PORZECANSKI & BAIGORRIA (1939), (c) a human strain isolated by SAVINO (1940), (d) an ovine strain from U.S.A., and (e) a bovine strain from U.S.A.

They concluded that the flagellar antigen of *L. monocytogenes* is divisible into three factors, A, B, and C. Two factors are present in each strain, B being common to all. The five strains were placed in two groups, *viz*, (1) the strains isolated by MURRAY *et al.* and by SAVINO, with flagellar antigen A, B, and (2) the three remaining strains with flagellar antigens B, C. The authors consider that all these strains are members of the same species.—MILLER WATSON.

JULIANELLE, L. A. (1941). **Biological and Immunological Studies of Listerella.**—*J. Bact.* **42.** 367–383.

Twenty-four strains of *Listerella*, isolated from infections in man, rabbit, gerbille, sheep, goat, cow, and fox, were used in this investigation. The organisms showed little saccharolytic or biochemical activity, and the carbohydrate and other tests in common use for bacterial differentiation were insufficient *per se* for identification of the genus or for classification of different strains.

Experimental pathogenicity was found to be very high. White mice, g. pigs, and rabbits succumbed in 2–10 days, following intraperitoneal inoculation of 10^{-6} ml. of 24-hour broth culture. Monkeys also were susceptible, but slightly more resistant. The most characteristic reaction to *Listerella* appeared to be the conjunctivitis and keratitis induced by simple instillation of broth culture into the conjunctival sac, in mice, g. pigs, and rabbits. There was little or no antibody response to this reaction, but the infected eye, on recovery, almost invariably acquired a resistance to reinfection, while the general level of resistance of the animal remained unaffected. High agglutinin titre in the circulating blood failed to protect the animals against ocular infection.

By agglutination, agglutinin adsorption, and precipitation tests, the strains were divided into two types, those isolated from ruminants, and those from rodents. Mouse-protection tests did not confirm this finding. High titre antisera gave little protection to mice. Neither type of *Listerella* stimulated "heterophile" antibody during active infection or prolonged immunization.
—ISOBEL W. BURTON.

MACCHIAVELLO, A. (1941). **Some Special Epidemiological and Clinical Features of Plague in Northeastern Brazil.**—*Publ. Hlth Rep., Wash.* **56.** 1657–1661.

The paper concerns primarily human plague (*Pasteurella pestis* infection) in Brazil. Plague infection was demonstrated in two species of preá and also in a species of rabbit and in hares for the first time. Among factors described as having an influence on the spread

of human plague is disease, other than *Past. pestis* infection, in wild mammals that have relationships with the life of the arthropod vectors of that organism. Examples of such disease are *Past. lepiseptica* infection and, possibly, *Past. pseudotuberculosis* infection in wild rabbits, *Past. aviseptica* infection in fowls and ducks, *Bacterium. coli* infection in mocós (*Heredon rupestris*), what seemed to be a new species of *Pasteurella* in *Didelphis* sp. (oppossum), and infection with *P. pseudotuberculosis rodentium*, *Pfeifferella whitmori*, a *Klebsiella*, a " paracolibacillus ", and possibly *Listerella monocytogenes*, *Brucella bronchiseptica*, *Corynebacterium pseudotuberculosis murium*, *Actinobacillus* sp. and *Trypanosoma lewisi* in rats. Of the fleas observed on rats or in their nests only *Xenopsylla cheopis* was found to be plague infected.

A short report is given on extensive epizootics amongst domestic cats in Brazil. Some of these were due to a filtrable virus and the disease was given the descriptive name " adenomyelo-enterosis ". A definite relationship seems to exist between this disease and migrating rats, since the rats can harbour the causative virus in the brain for as long as 90 days. These rats probably carry the disease from city to city. The cats, in their turn, harbour the " paracolibacillus " which causes severe epizootics amongst rats and which is present in their faeces.—M. H. Kyaw.

Reis, J., & Nóbrega, P. (1941). Ensaios de vacinação contra a cólera aviária. **[Vaccination against Fowl Cholera with Four Different Kinds of Bacterins].**—*Arq. Inst. biol., S. Paulo.* **12.** 81–85. [English summary].

The authors prepared four different bacterins from a fluorescent strain of *Pasteurella aviseptica*. One was prepared by adding silver nitrate to the bacterial suspension (Rainsford's method). A second was prepared by submitting three hours' culture to heat at 56°C. for 15 min. The remaining two were prepared with saponin in one case and formalin in the other.

In spite of the fact that the bacterins were used in concentrated form, never more than 30% of treated birds resisted infection.—Miller Watson.

Reis, J. (1941). Eliminação da " Pasteurella avicida " pelas fezes. **[The Presence of *Past. aviseptica* in the Faeces of Infected Birds].**—*Arq. Inst. biol., S. Paulo.* **12.** 307–309. [English summary].

The faeces of fowls artificially infected with fowl cholera were examined for the presence of *Past. aviseptica*. In one case out of nine, the organism was found in faeces passed immediately before death ; in the other eight cases no organisms were passed in the faeces, although *Past. aviseptica* was found in the cloacae after death. In all cases the blood and nasal mucus were infective from the earliest stages of the disease.

Two birds were treated with sulphanilamide and did not die, although they developed the disease. *Past. aviseptica* could not be isolated from the faeces, blood, or nasal mucus of these birds at any stage of the disease.

One bird developed a chronic form of fowl cholera which lasted for a month. During the first nine days *Past. aviseptica* was passed in the faeces, but not thereafter.—Miller Watson.

Schoop, G. (1942). Tularämie auch im Wartheland. **[Tularaemia in Wartheland].**—*Dtsch. tierärztl. Wschr.* **50.** 81.

Tularaemia was found in two hares showing P.M. changes closely resembling those of pseudotuberculosis. Cultures were negative ; a g. pig test, however, proved positive and *Bacterium tularense* was demonstrated. —T. Bakker.

Stephan, J. (1941). Ueber die Ausbreitung des Bacillus pseudotuberculosus rodentium Pfeifferi und seine Differenzierung. **[The Incidence of *Pasteurella pseudotuberculosis* and its Differentiation].**—*Tierärztl. Rdsch.* **47.** 52–56.

The incidence of *Past. pseudotuberculosis* infection is discussed ; it has been reported in nearly all rodents, and in poultry, dogs, cats, goats, monkeys, and horses. S. examined cases of natural infection, in hares, rabbits, cats, turkeys, and two bears. P.M. examinations revealed the uniformity of the symptoms in all animals, *viz*, emaciation, acute gastro-enteritis, caseous lymphadenitis, and miliary yellowish nodules in the liver, spleen and other organs. The organism isolated by S. differed from *Past. septica*, *Past. pestis*, *Salmonella pullorum*, and *S. gallinarum* in the following respects :– (a) litmus-milk was rendered alkaline without previously turning acid ; (b) there was fermentation of adonite, rhamnose, and salicin ; (c) saccharose and sorbitol were not fermented ; and (d) no indol was formed.

The strain differed from *Past. pestis* in that litmus-glycerin-agar was made acid and there was less marked haemolysis of blood agar.—E. Weissberg.

Reis, J. (1941). Doença de pintos causada pelo bacilo piociânico. **[Disease in Chicks caused by *Pseudomonas aeruginosa*].**—*Arq. Inst. biol., S. Paulo.* **12.** 147–154. [English summary].

R. describes a disease of young chicks caused by *Ps. aeruginosa*. It appeared when the chicks were about 20 days old and was characterized by progressive weakness and wasting. The birds were unable to stand up and rested on the metatarsus. In the later stages of the disease dyspnoea was a pronounced feature, and in some cases there was considerable oedema of the head. The possibility of the disease being coryza, rickets, coccidiosis, or helminth infestation was disposed of by examination and the causal agent was found to be *Ps. aeruginosa*, which was isolated from the blood and abdominal organs. The disease was reproduced artificially by inoculation of cultures and by the administration *per os* of cultures and of material from infected organs.—M. W.

Röhrer, H., & Winand, H. (1941). Enteritisbakterienfunde im Rheinland. **[Salmonella Infection in Domestic Animals in Rhineland].**—*Z. Infektkr. Haustiere.* **57.** 201–219.

A report of a detailed bacteriological survey into salmonella infection of domestic animals in the Rhineland province, between January 1938 and June 1940. Sources of material included abattoir specimens, faecal samples, foodstuffs, and various diagnostic samples. An elaborate technique with several special culture media and serological strain-typing sera was employed.

Salmonella were found in carcass material as follows :– *S. enteritidis* var. *dublin* in 121 calves, 23 cattle, 8 horses, and 3 pigs ; *S. enteritidis* (arabinose positive Accra type) in 8 calves and 2 cows ; *S. enteritidis* (Jena type) in one calf and one cow. *S. typhi-murium* was found in 17 cattle, 9 calves, 8 horses, 2 sheep and 12 pigs ; *S. typhi-murium* (ammonia-weak strain) from one cow. *S. paratyphi B.* (Odense type) was found in one cow, *S. suipestifer* in 2 pigs, *S. derby* in 2 pigs, and *S. abortus-equi* in 4 horses.

In faecal samples *S. enteritidis* var. *dublin* was found in 67 cattle and *S. typhi-murium* in 38 cattle.

S. enteritidis var *dublin*, *S. enteritidis* (Jena type) and *S. typhi-murium* were each found in sausages.

In miscellaneous diagnostic work *S. enteritidis* var. *dublin* was found in two cows' udders, *S. enteritidis* (Jena type) in a case of duck-egg food poisoning, *S. typhi-murium* once in duck faeces, *S. typhi-murium* (rhamnose-type) in a duck and in duck faeces, and

S. typhi-murium (ammonia-weak type) in pigeon faeces, whilst *S. suipestifer* was found in one case of swine fever.

The various species and their types, as found in this work, are described with reference to their distribution in the Rhineland and their cultural and serological properties.

The authors advocate the provision of typing sera at veterinary bacteriological laboratories in Germany. —O. D. JAMES.

SCHMIDT, J. (1941). Der Paratyphus des Pferdes. [**Equine Paratyphoid**].—*Dtsch. tierärztl. Wschr.* **49.** 622–625.

Endemic or isolated outbreaks of an acute-gastro-enteritis with a high mortality have been encountered with increasing frequency since the outbreak of the present war. In every case where the horses were slaughtered or where the disease proved fatal, *Salmonella typhi-murium* was demonstrated in the various organs. Serological tests and examination of the faeces did not always yield a positive result. Invasion of the tissues from the intestinal tract takes place under special conditions, *e.g.* colic, indigestion, over-exertion, or ingestion of damaged or contaminated foodstuffs. Descriptions of clinical cases are given. Although the meat inspection of horses slaughtered because of colic has always shown a high incidence of *S. typhi-murium*, S. is of the opinion that a distinct disease "equine paratyphoid" should be recognized.—T. BAKKER.

I. WINAND, H. (1941). Ueber eine gaslose Variante des Bact. ent. Gärtner Kiel beim Kalbe. [**A Non-Gas-Forming Variant of** *Salmonella enteritidis* **var.** *dublin* **in a Calf**].—*Z. Fleisch- u. Milchhyg.* **51.** 118–119.

II. LÜTJE, F. (1941). Stellungnahme zu der Arbeit von Winand "Ueber eine gaslose Variante des Bacterium enteritidis Gärtneri Kiel beim Kalbe". [**Commentary of Winand's Article "A Non-Gas-Forming Variant of** *Salmonella enteritidis* **var.** *dublin* **in a Calf"**].—*Ibid.* 157–159.

I. In the course of bacteriological examination of the meat of a calf slaughtered in an emergency, septicaemia due to a non-gas-producing variant of *S. enteritidis* var. *dublin* was found; the organism, however, produced acid but no gas in dextrose, mannite, rhamnose and dulcite. Indole was not produced.

II. L. states that WINAND's article would lead to the erroneous view that a non-gas-forming variant of *S. enteritidis* var. *dublin* is rarely found, whereas it has been recognized for a long time and is often described in association with diseases of new-born animals. These findings are perhaps overlooked because of the varying nomenclature; the Danes use the term "*Parakoli*" for the prevalent type of *S. enteritidis* var. *dublin* and also for the less frequently occurring *S. typhi-murium*. In this category also belong JENSEN's non-gas-forming Parakoli type, HAFFNER's causative organism of miliary necrosis (*Bacterium nodulifasciens bovis*) which are identical with *S. enteritidis* var. *dublin*, STICKDORN's typhoid Gäertner types, CHRISTIANSEN's *Parakoli* type, and KARSTEN's typhoid Gaertner types.

L. discusses this non-gas-producing variant. It is easily recognized in mammals, but in fowls a superficial examination may lead to confusion with *S. pullorum*.

There are some strains of *S. enteritidis* var. *dublin* which, although primarily non-gas producers, later produce gas in small quantities.—J. Z.

WALKER, D. J. (1939). **Some Salmonella Infections in Sheep.**—*Yearb. Inst. Insp. Stk, N.S.W., 1939.* pp. 27–32. Sydney.

W. records some outbreaks of disease in sheep, believed to be caused by *S. bovis morbificans*, and a new strain of *S. typhi-murium*. There was considerable variation in the symptoms, but scouring, lassitude, and thirst were generally observed. The most prominent P.M. lesions were abomasitis, enteritis, and swelling and oedema of the mesenteric lymph nodes. Erosion of the gastro-enteric mucous membrane was not infrequent. In many cases there was cloudy swelling of the liver, and the gall bladder was occasionally involved. Petechial haemorrhages were present in the cortex of the kidneys.

Outbreaks occurred during the extreme heat of summer, and were associated with a poor water supply, and with the presence in the pasture of a plant, *Solanum esuriale*, believed to be poisonous, which may have lowered the resistance of the bowel wall and allowed entrance of the pathogens.—ISOBEL W. BURTON.

*HEGYELI, Z. (1940). [**Immunization of Pigs with Live and Dead Cultures of** *Salmonella cholerae-suis* **var.** *kunzendorf*].—*Közl. Összehas. élet- es kórtan Köréből.* **27.** 502–507. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 205].

Pigs were immunized against infection with *S. cholerae-suis* var. *kunzendorf* by two injections of dead organisms followed by oral administration of 50 ml. of live culture. When, at a later date, these animals were fed a dose of virulent culture and, on the following day, were vaccinated against swine fever by the simultaneous method, they withstood vaccination without losses, whereas controls succumbed to *S. cholerae-suis* var. *kunzendorf* infection.—M. LANDAU.

WINAND, H. (1940). Ein weiterer Fall von Bakt. ent. Derby beim Schwein. [**A Further Case of** *Salmonella derby* **Infection in Swine**].—*Z. Fleisch- u. Milchhyg.* **50.** 266.

S. derby was recovered from a swine carcass in the course of bacteriological meat inspection. This is the 14th time this organism has been reported, six of the strains having been recovered from swine. *Antemortem* symptoms included fever and inappetence; double pneumonia was found on P.M. examination. *Erysipeloturix rhusiopathiae* was also recovered.

Details of the characteristics are enumerated. —E. WEISSBERG.

WAGENER, K., & MILBRADT, H. (1940). Untersuchungen über die Entstehung der Enteritis-(Gärtner)-Infektion der Füchse. [**Experimental** *Salmonella enteritidis* **Infection in Foxes**].—*Berl. Münch. tierärztl. Wschr.* April 26th. 197–199.

Feeding experiments were carried out on 30 red-fox cubs; one group was fed raw meat with or without the addition of vegetable, and a second group was given cooked minced meat with or without vegetable. After three weeks the animals fed on cooked meat developed marked symptoms of rickets. Salmonella-infected meat was then given at intervals to all animals during the following three weeks, but no case of salmonella enteritis was recorded. Bacteriological examinations showed the animals to be free from salmonella.

The same animals were then fasted for 40 hours and an anthelmintic was administered; six hours afterwards salmonella-infected meat was given, but no infection resulted.

In order to test the presence of a virus possibly associated with the salmonella enteritis, organs of naturally infected foxes were filtered, and the filtrate inoculated into healthy foxes; salmonella-infected meat was again fed, but no infection was set up.—E. W.

WYNOHRADNYK, V. (1940). Bacterium gallinarum und B. pullorum. [*Salmonella gallinarum* **and** *S. pullorum*].—*Dtsch. tierärztl. Wschr.* **48.** 61–63.

Sixty-six non-motile, serologically pullorum-positive strains from three different flocks were tested for

biochemical reactions. Some of the strains were tested soon after isolation and others after a period of four years. The strains recovered from two flocks did not ferment dulcite, but some of them fermented maltose. All strains isolated from the third flock fermented dulcite, but did not show a uniform reaction in dextrose and maltose. The dulcite-fermenting and dulcite non-fermenting strains were otherwise indistinguishable. According to GUENTHER, however, *S. gallinarum* sometimes loses its dulcite-fermenting property.

W. concludes that, in addition to the typical *pullorum* and *gallinarum* strains isolated from cases of bacillary white diarrhoea, other non-motile serologically pullorum-positive strains can be recovered, which, according to their biochemical reactions, can be regarded neither as typical *pullorum* nor as typical *gallinarum* strains. W. therefore agrees with KLIMMER in regarding B.W.D.-salmonella as a series of strains having a wide range of biochemical reactions, and ranging from typical *S. pullorum*, over intermediate strains, to *S. gallinarum*. He also supports Klimmer's suggestion that *S. pullorum* and *S. gallinarum* should be regarded as varieties of the same organism, *viz*, *S. gallinarum* var. α (= *gallinarum*) and *S. gallinarum* var. β (= *pullorum*).
—E. WEISSBERG.

BUNYEA, H., & MACDONALD, A. D. (1942). **The Pathogenicity of *Aerobacter Aerogenes* and *Escherichia acidi lactici* for Turkeys and Their Response to the Agglutination Test for Pullorum Disease.**—*Poult. Sci.* **21.** 306–310.

Organisms identified as *Bacterium acidi lactici* and *Aerobacter aerogenes* were isolated from the ovaries of turkeys which had given positive reactions to tests for *Salmonella pullorum* infection. The organisms isolated showed some antigenic relationship to *S. pullorum*, but the latter organism was not recovered. Intraperitoneal inoculation of poults with broth cultures of the organisms was followed by death in some cases.—F. D. A.

BURROWS, W. (1941). **Oxidation-Reduction Potentials in Salmonella Cultures. III. The Relation Between Characteristic Potential and Antigenic Structure.**—*J. infect. Dis.* **69.** 141–147. [For previous parts, see *V. B.* **5.** 792, and **7.** 209].

B. determined the characteristic potentials produced in nutrient and phenol broth cultures by 31 different species of *Salmonella*. The evidence on the whole suggested that a relationship may exist between such potentials and the immunological characters of the bacterial species.

The Eh ranges over which somatic antigens occurred in phenol broth cultures were, in general, slightly more positive than the Eh ranges of cultures containing both somatic and flagellar antigens.

There was no marked correlation between the biochemical characters of the organisms and the oxidation-reduction potentials in plain broth culture.
—ISOBEL W. BURTON.

*ZANTINGA, J. T. (1941). **[Brucellosis in Horses].**—*Tijdschr. Diergeneesk.* **68.** 68–83. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 206].

Z. states that brucellosis in horses is associated not only with hygromata of the poll or withers but also with obscure types of lameness. The former are more easily cured than the latter.

*—. (1941). **[Report on Control of Bovine Brucellosis in Norway from 30th June, 1941].**—*Norsk VetTidsskr.* **53.** 318–322. [Translation of abst. in *Wien. tierärztl. Mschr.* **29.** 217].

99% of herds in Norway in which brucellosis has been found to exist have been freed from it: it can be regarded as eradicated.

*HINDERSSON, R., HUHTALA, R. E., & HILDEN, E. (1941). **[Fundamentals of Control of Bovine Brucellosis].**—*Suom. Eläinlääkäril.* **47.** 1–22. [German summary]. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 510].

A detailed review of methods used in Finland for the control of bovine brucellosis. A diagnosis of contagious abortion is given when *Br. abortus* can be isolated from the aborting cow or when, in a previously clean herd, the affected animal shows a serum titre of 1 : 50 or more. A positive whey titre is not taken as certain evidence of infection, but must be confirmed by a blood test.

Of the various methods of control, isolation and disposal of reactors has proved successful where the initial number of reactors was small and where there was conscientious co-operation by the herd owner.

Vaccination combined with simple hygienic measures was the method of choice where the course of the disease had been rapid. A live vaccine, prepared from an avirulent strain of American origin [strain 19 ?] was used. Vaccination of adult animals was carried out only as a last resort, when all other measures to check the progress of the disease had failed. Bulls were never vaccinated. Calves were vaccinated when 6–9 months old. Vaccination was discontinued as soon as blood tests had shown that infection in the older animals had been overcome.—M. LANDAU.

IVANOVA, V. I. (1939). Diagnostika latentnykh form brutselleza. **[Diagnosis of Latent Forms of Brucellosis].**—*Sovyet Vet.* No. 5. pp. 23–28.

Brucella-infected g. pigs possess an increased sensitivity to brucellin and brucellysate. Usually they succumb within 10–72 hours after the injection of 0·5 ml., showing hypothermia, and acute haemorrhagic inflammation of lymph nodes and parenchymatous organs. Smaller doses (0·2 ml.) which are not lethal, cause a rise in temperature and in the agglutination titre of the blood serum.

Similar experiments in sheep show that, after the injection of 2·5–5 ml. of brucellysate, there occurs, in the chronic latent carrier with a negative aggln. reaction, a gradual appearance of agglutinins in the serum, the maximum titre being attained on the tenth day with subsidence by the 20th day after injection. Heavy doses of brucellysate produce considerable haemorrhagic inflammation of the lymph nodes in infected sheep, whereas in artificially sensitized sheep this does not occur. Control experiments in healthy and infected g. pigs and sheep confirmed these results.

Under field conditions, this method was used on 46 chronic latent carriers, on 25 and 75 sheep which had reacted to abortin during 1936 and 1937 respectively, and on 25 normal sheep. In addition, ten chronic latent carriers received two doses (2·5 and 5 ml.) of brucellysate at an interval of eight days. The aggln. titre reappeared in 41·3% of the 46 latent carriers, in 28% of the 25 and in 16% of the 75 sheep which had previously reacted to abortin, and in 60% of the ten animals given two inoculations. There was no increase in the aggln. titre of the 25 normal sheep. The author claims that this method is strictly specific and she believes that it can be satisfactorily used as an additional diagnostic measure in latent carriers and for the differentiation of allergic and similar sensitization reactions.—A. M.

GLADKOV, A. D. (1940). Opyt osvobozhdeniya ot brutselleza kolkhozov v sele Rogachevke. **[Experiences in Brucellosis Eradication on Collective Farms in Rogachevka].**—*Sovyet. Vet.* No. 5. pp. 31–33.

This is a preliminary report on the eradication of brucellosis on nine collective farms and one Sovyet farm

(Sovkhoz). The first outbreak was recorded in November 1938 among privately owned sheep and within a few months abortions occurred on the other farms. As animals of various farms were in contact on the pastures with infected animals, it was decided to test the whole animal population of the village. The first agglutination test was performed in May 1939 and the second test during June-July; the serum aggln. test was used for horses and pigs; cattle were submitted to the serum agglutination and intradermal tests, using abortin for the latter; sheep and goats were submitted to the intradermal test using brucellysate and on two farms which were found to be most heavily infected, the serum agglutination test was used in addition. A third intradermal test was performed on cattle, sheep, and goats in August, and doubtful reactors were retested in September.

Among cattle, which had been found infected with *Br. melitensis*, seven reactors were detected by the aggln. test and 27 by the intradermal test. The tests agreed in only one animal. It was found that animals with a high agglutinin titre and animals which had recently aborted, and from whose foetuses brucella were isolated, do not always react to abortin; the importance is therefore stressed of the instructions of the Ministry of Agriculture requiring two serum aggln. tests to be made before the application of an intradermal test with abortin.

G. stresses the diagnostic value of brucellysate in sheep. 5·1% reactors were detected after the first test and only 0·4% after the second test. Among other measures, all reactors were concentrated and isolated on the most heavily infected farm and after a few days were sent to abattoirs. The remaining flocks were kept on isolated pastures and all yards and premises were thoroughly disinfected. Change of pastures after each testing was not possible.—A. MOLDAWSKY.

PERVUSHIN, B. P., & PANKRATOV, A. Y. (1940). Opyt sanatsii brutselleznogo ovtsevodcheskogo khozyaïstva. **[Experiments in Brucellosis Control on a Sheep Farm].**—*Sovyet. Vet.* No. 5. pp. 21–31.

The authors report on 2½ years' eradication work on a large Sovyet sheep-breeding farm. Abortions, attributed to a sheep-pox epizootic, were observed from 1929–30 after the importation of 400 Rambouillet breeding sheep from Germany. It was recognized as brucellosis after many cases of Malta fever had occurred in farm personnel. During 1933–35 all the sheep on the farm were twice tested with abortin, the reactors were segregated, and other control measures were applied, which resulted in some improvement, but the results were not satisfactory. The method of eradication advised by the All-Union Institute of Experimental Veterinary Medicine was used. Combined agglutination and intradermal tests were carried out and the sheep were divided into infected, "suspicious" and presumably uninfected groups; the healthy flocks were built up by rearing the young stock in isolation. The animals of the infected group were gradually disposed of, and those of the "suspicious" group were tested twice in the ensuing year, each test being made at the time of the seasonal change to and from pasture. These tests are then repeated annually. It is stated that as long as the infection rate does not exceed 30–40%, the eradication of infection is not difficult.

This procedure is accompanied by changes on to "clean" pastures after each test, the usual disinfection methods, etc., being carried out. Lambs are tested soon after weaning. Non-reactors after dipping are removed to separate, thoroughly cleaned farms and undergo two tests within 30–35 days. All other farm animals and the personnel are tested annually. The pastures are divided into sections and no section is used for longer than a week at a time. This is also important for simultaneous control of helminths. The pastures used by the infected group are ploughed and cropped and the crops from these pastures fed only to the infected group. The farm boundaries are guarded and errant dogs are controlled and also rodents. Special attention should be paid to the construction and maintenance of the folds, which should be provided with isolation pens for ewes which are about to abort. All aborted and stillborn lambs undergo immediate bacteriological examination. All aborted ewes are tested seroallergically after 5–7 days and in negative cases twice retested before returning to the flocks.

By this system the authors freed six out of eight farms containing altogether 12,000 sheep. Altogether the abortions diminished from 9·14% to 2·6%. Lambs weaned in 1937 from the supposed uninfected adult group had only 0·3% reactors and doubtful reactors and these did not increase during 1938. Lambs weaned in 1938 had no reactors. Lambs born and weaned from the infected group gave 2·1% of reactors as compared with 7·5–15·5% in previous years.

Among the personnel during the same period no infections were registered in those in contact with the segregated groups and only three cases occurred in those in contact with the infected group, whereas in previous years many dozens were registered annually. —A. MOLDAWSKY.

CAMERON, H. S., HUGHES, E. H., & GREGORY, P. W. (1942). **Genetic Resistance to Brucellosis in Swine.** —*J. Anim. Sci.* **1.** 106–110.

The work previously reported [see *V. B.* **11.** 672.] is being continued. To date, 23 litters (128 progeny) from four resistant sows have been tested for resistance to *Br. suis* infection. 98 young have been shown to be resistant, one has been shown to be susceptible, while in 29 cases susceptibility was "undetermined". It is hoped that further work will determine the mode of inheritance, and it is suggested that the development of resistant strains has a practical application in the control of porcine brucellosis. Resistance has been demonstrated in pure-bred Poland China and Duroc Jersey pigs as well as in grade stock.—ALASTAIR N. WORDEN.

TARASOV, I. A. (1940). Ispytanie "poluzhidkikh" formolvaktsin pri brutselleze. **[Semi-Liquid Formol Vaccines in Brucellosis].**—*Sovyet. Vet.* No. 5. pp. 35–36.

Groups of g. pigs were immunized 2–3 times subcutaneously, intravenously, or intracutaneously with dead formol vaccines, prepared from brucella grown in liver extract to which semi-liquid agar was added, and they were infected after several weeks with massive doses of living cultures of *Br. melitensis*. Subcutaneous vaccination conferred no protection against infection. Only in three out of 15 g. pigs vaccinated intracutaneously and in five out of 32 vaccinated intramuscularly could *Br. melitensis* be detected by bacteriological examination of the organs when examinations were made later [interval not given].—A. MOLDAWSKY.

KARSTEN. (1941). Ueber das Problem der Schutzimpfung gegen den Abortus-Bang insbesondere bei Kälbern. **[The Problem of Vaccination, Especially in Calves, against Bovine Brucellosis].**—*Dtsch. tierärztl. Wschr.* **49.** 628–633.

K. gives a lengthy review of recent literature on this subject, and concludes that insufficient attention is paid in Germany to calf immunization with live vaccine prepared from attenuated strains of *Br. abortus*.—T. B.

KRASOV, V. M. (1941). Biokhimicheskie i immunologicheskie svoĭstva fraktsiĭ, vydelyaemykh pri hidrolize bakteriĭ brutsell. **[Biochemical and Immunological Characters of Hydrolysates of Brucella Organisms].**—*Veterinariya, Moscow.* No. 1. pp. 56–68. [French summary].

Extraction of brucella in an autoclave with dilute H_2SO_4 caused partial hydrolysis of the protein complex of the organisms, resulting in six different substances, four of them nucleoproteins, one histone, and one globulin. The nucleoprotein fractions preserved their allergenic as well as their agglutinogenic properties, while the histone and globulin fractions retained only their allergenic properties.

Improvements in the method of preparation of the brucella hydrolysate resulted in a stable standard product which yielded five times the number of diagnostic doses from one unit weight of organisms.—A. MOLDAWSKY.

*ROKKE, B. (1941). **[Preparation of Bradsot Vaccine].**—*Norsk VetTidsskr.* **53.** 385–404. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 217].

The original is said to contain details of preparation of the vaccine by a method similar to that of DUNGAL [*V. B.* **3.** 19.]; data are given of its value in sheep.

BENNDORF, H. M. (1940). Ueber einen neuen Gasödemerreger des Hundes. **[A New Gas Oedema Organism in Dogs].**—*Berl. Münch. tierärztl. Wschr.* May 17th. 229–232.

An anaerobe was isolated from a dog with haemorrhagic oedema and emphysema of the chest and extremities, together with chronic endocarditis, some fatty change of the myocardium and liver, and small infarcts of the kidneys, interstitial nephritis being present. Morphologically and culturally the organism could not be identified with any of the recognized gas-oedema bacilli. It showed a relationship to *Clostridium oedematiens*, but differed from that organism in its biochemical reaction.—E. WEISSBERG.

OAKLEY, C. L., & WARRACK, G. H. (1941). **Factors Affecting the Activity of α Toxin of *Clostridium Welchii*.**—*J. Path. Bact.* **53.** 335–370.

The authors reveal the errors to be avoided when using certain of the several methods for evaluating the α toxin of *Cl. welchii*. When the test involves the use of indicators such as red blood cells, human serum, or lecithovittelin, the endpoint obtained is dependent on several factors, chiefly the concentration of ionized calcium and magnesium present, but also on the pH, the species of r.b.c., and the presence of peptone and normal horse serum. The importance of controlling the Ca and Mg concentration in the various tests is discussed in detail. Such values as the M.L.D., M.N.D., and flocculation, are independent of the Ca concentration in the test reagents. The marked effect of ionized Ca on the *in vitro* combining power of α toxin is fully described. Observations are made on such topics as toxin-antitoxin dissociation, irregular sera, titration of α toxoid, and the necessity for fully qualitative estimations of *welchii* toxins.

As a result of this investigation, a number of rules and methods are given which should govern the routine *in vitro* testing of the α toxin of *Cl. welchii*.—J. KEPPIE.

KELLAWAY, C. H., & TRETHEWIE, E. R. (1941). **The Injury of Tissue Cells and the Liberation of Pharmacologically Active Substances by the Toxins of *Cl. welchii* Types B and C.**—*Aust. J. exp. Biol. med. Sci.* **19.** 77–87. [Author's summary copied *verbatim*].

The toxins of *Cl. welchii* types B and C injected intravenously have similar effects on the circulation of cats, both causing a rise in pressure in the pulmonary artery and a steep terminal fall in systemic pressure often accompanied by heart block and invariably by a sharp rise of venous pressure. The first effect with smaller doses of type C toxin is a prolonged rise of systemic blood pressure.

The toxin of *Cl. welchii* type B causes the liberation of histamine from the perfused lung of the cat, but fails to do so from the perfused lung of the g. pig. The toxin of *Cl. welchii* type C causes the liberation of a slow reacting muscle stimulating substance from both preparations. Both toxins cause the liberation from the perfused liver of the rabbit of pigment, of adenyl compounds, and of a heat labile agent which inactivates these latter compounds.

Both toxins cause contraction of the isolated jejunum of the g. pig and of the uteri of the virgin g. pig and rat. These responses were shown to be specific, except that of the isolated uterus of the g. pig to type B toxin, in which a histamine-like impurity was present.

WOLTERS, K. L. (1941). Ueber die Tetanusprophylaxe. **[The Prevention of Tetanus].**—*Berl. Münch. tierärztl. Wschr.* March 21st. 141–143.

A review of modern methods of immunization against tetanus and advocacy of large-scale active immunization of horses and soldiers.—J. E.

ACHESON, G. H., RATNOFF, O. D., & SCHOENBACH, E. B. (1942). **The Localized Action on the Spinal Cord of Intramuscularly Injected Tetanus Toxin.**—*J. exp. Med.* **75.** 465–480.

Local tetanus in the cat resulting from intramuscular injection of toxin, is associated with a characteristic response, originating in that region of the spinal cord from which the innervation of the injected area arises. The toxin acts selectively upon the segments of the spinal cord which supply the local innervation, the effect being independent of changes in the muscle, the neuro-muscular junction, the afferent or efferent peripheral nerves, or the dorsal root ganglia.

The augmented spinal response may be prevented by section, prior to inoculation, of the nerve trunks supplying the inoculation site, but may still be elicited in the absence of peripheral signs of local tetanus. The authors conclude, therefore, that in local tetanus, the toxin is carried to the spinal cord by way of the peripheral nerves.—ISOBEL W. BURTON.

MCILWAIN, H. (1942). **Bacterial Inhibition by Metabolite Analogues. 3. Pantoyltaurine. The Antibacterial Index of Inhibitors.**—*Brit. J. exp. Path.* **23.** 95–102.

M. had previously shown that pantothenic acid (pantoyl β-alanine) is an essential growth factor for certain pathogenic organisms. The substitution of a $—SO_3H$ or $—SO_2NH_2$ grouping for —COOH in various other growth-promoting substances was known to produce an inhibitory substance, and based on this analogy, the analogue of pantothenate, pantoyltaurine, was found to be a growth inhibitor *in vitro* to various types and strains of *Streptococcus haemolyticus*, *Str. pneumoniae*, and *Corynebacterium diphtheriae*, which require pantothenate as a growth promoter. Organisms not inhibited included *Bacterium coli*, *Proteus vulgaris* and *P. morgani*, and *Staphylococcus aureus*. Pantoyltaurine apparently acts by becoming attached to the organism at enzymes where pantothenic acid must react for normal activity and growth. Its affinity for these enzymes is much less than that of pantothenic acid, and a large excess is necessary to block them. The relationship between inhibitor and metabolite is termed the antibacterial index, which is defined as the ratio C_I/C_M, where C_I is the concentration of an inhibitor just bacteriostatic in presence of a concentration C_M of the

corresponding metabolite. These ratios, which vary for the type of organism under consideration, compare favourably with those of other bacteriostatic compounds such as sulphanilamide, and the normal concentration of pantothenic acid in tissues is sufficiently small to warrant anticipation of antistreptococcal activity *in vivo*.
—ALFRED EDEN.

GRIFFITHS, J. J. (1942). **The Use of Mucin in Experimental Infections of Mice with** *Vibrio cholerae*.—*Publ. Hlth Rep., Wash.* **57.** 707–710. [Authors' summary copied *verbatim*].

Recently isolated strains of *Vibrio cholerae* are capable of proliferating and killing mice when relatively small numbers of organisms suspended in mucin are injected peritoneally. This enhancing effect of mucin has not been noted with two remotely isolated strains.

VERTINSKIĬ, K. I. (1940). Stakhibotriotoksikoz loshadeĭ. [**Food Poisoning in Horses due to** *Stachybotrys alternans*].—*Sovyet. Vet.* No. 5. pp. 61–68.

A detailed description of the symptoms and P.M. changes of highly fatal poisoning in horses, which occurs during the housing period and following the ingestion of damp straw and hay containing the toxins of a pathogenic variety of *S. alternans*. The condition, which for many years was unrecognized and regarded as a new disease, is characterized by necrotic stomatitis, especially around the lips and corners of the mouth, and swelling of the head. In some atypical cases there is pyrexia, and nervous symptoms dominate the picture. No effective curative treatment was found. Preventive measures depend upon proper fodder storage conditions.

It was found that this fungus multiplies and produces toxin only in dead, damp fodder. In well dried cellulose substances with a moisture content not exceeding 20%, the fungi do not multiply nor produce toxin. The fungus inoculated into horses without its toxin proved harmless. Local application of chloroform extracts of the toxin produced sero-haemorrhagic inflammation with subsequent necrosis. The toxin is thermostabile, is not destroyed by acids (hydrochloric and sulphuric), and is easily neutralized by alkali. It is cumulative.—A. MOLDAWSKY.

MOSELIANI, D. V. (1940). Stakhibotriotoksikoz loshadeĭ. [**Stachybotrys Infection in Horses**].—*Sovyet. Vet.* No. 10. pp. 42–44.

Poisoning due to the ingestion of fodder contaminated by the fungus *Stachybotrys alternans* was first observed in the U.S.S.R. during 1935–36, when it occurred on several farms. Later, the condition spread to several provinces. Only in 1939 was the real cause recognized, by the combined investigations of the Moscow veterinary institute and the Moscow mycological research laboratory.

The origin and spread of this condition was favoured by periods of heavy rain, by bad conditions of harvesting, and by the importation of infected straw from affected areas.

The course of the disease was mostly acute, with a high mortality, the general symptoms being depression, anorexia, staggering gait, trembling, partial blindness, involuntary chewing movements, increased respiration, increased arythmic pulse, and pale mucous membranes showing petechial haemorrhages.

The lesions seen P.M. were those of haemorrhagic gastro-enteritis. There were areas of necrotic erosion on the oral mucous membrane and along the whole intestinal tract. The tongue was usually free from ulceration. There were petechial haemorrhages on the pleura, intercostal spaces, endocardium, pericardium, and bladder and subcapsularly in the spleen. The lymph nodes, especially those of the digestive tract, were oedematous and haemorrhagic. The central nervous system, kidneys, and liver were usually normal.

No successful treatment was found. Preventive measures should be directed towards proper harvesting of the forage and education of the farmers as to the symptoms and cause of this condition.—A. M.

DISEASES CAUSED BY PROTOZOAN PARASITES

CAMPOURCY. (1942). Recherches sur l'infection de *Glossina palpalis* par *Trypanosoma gambiense* au Cameroun. [**Infection of** *G. palpalis* **with** *T. gambiense* **in the Cameroons**].—*Rev. Sci. méd. pharm. vét., Brazzaville.* **1.** 59–75.

C. maintained wild *G. palpalis* in small cages of mosquito netting, 8 cm. × 11 cm.; of the total number of pupae deposited by caged females, 66·3% developed into normal, viable imagoes. In examining flies for evidence of *T. gambiense* infection, he found inadequate the routine examination of exuded saliva only, many flies containing trypanosomes only in the proboscis or intestine or other parts of the body, and having none free in the saliva. A rapid method is outlined of dissection and examination of the various organs likely to be infected.

It was found that *G. palpalis* could not be infected with *T. congolense* from a naturally infected cow, and could not transmit the infection to a healthy g. pig. A kid which was artificially infected with *T. gambiense* did not transmit the infection to healthy flies fed upon it, and the infection cleared up spontaneously after one month.

It is reported that kids, sheep, and pigs in the region of Obala are heavily infected with trypanosomiasis, probably *T. vivax*, but that they nevertheless thrive and increase. Hundreds of cows, of which some are always carriers, pass through the town every year *en route* for the market at Yaoundé.—E. S.

PATTEN, R. A., & CARNE, H. R. (1942). **Enterohepatitis in the Peafowl.**—*Aust. vet. J.* **18.** 31–32.

A fatal enterohepatitis apparently caused by *Histomonas meleagridis* occurred in peafowl running with turkeys in which blackhead had been observed. Clinical and P.M. features were indistinguishable from those of the disease in turkeys, except that there was no discoloration of the skin of the head and neck.—A. W. B.

OLAFSON, P., & MONLUX, W. S. (1942). **Toxoplasma Infection in Animals.**—*Cornell Vet.* **32.** 176–190.

Toxoplasma, a pyriform or elliptical organism, occurs either singly, in groups, or in pseudo-cysts which are found in mononuclear and endothelial cells and in many kinds of parenchymatous cells. Recent work indicates that there is only one species in mammals. The method of natural infection is unknown although tick transmission has been suggested. Experimental animals are readily infected by intraperitoneal or intravenous inoculation and die in 3–30 days. In the present paper, six infections are described, *viz*, one in a sheep, one in a cat, and four in dogs. The onset of the disease is sudden, it runs a short course, and is accompanied by high temperatures and depression. Coagulation necrosis of the intestine, lymph nodes, liver, and lungs and

pulmonary oedema are the associated lesions. The infected cat showed necrotic lesions in the intestine and mesenteric lymph nodes, and the lungs exhibited a pronounced epithelial hyperplasia. The sheep showed a diffuse encephalomyelitis. Infection was experimentally transmitted from a dog to a puppy from which it spread to other puppies in the same pen and produced fatal infections in all. *Toxoplasma* infections sometimes present difficulties in differential diagnosis as they may resemble distemper, leptospirosis, or a foreign body reaction.—C. HORTON SMITH.

I. SHCHENNIKOV, S. T., ORLOVA, Z. V., & BUĬNITSKAYA, M. I. (1939). K voprosu etiologii dizenterii svineĭ. **[On the Aetiology of Swine Dysentery]**.—*Sovyet. Vet.* No. 6. pp. 22–24.

II. SHCHENNIKOV, S. T. (1939). Dizenteriya svineĭ i bor'ba s neyu. **[Swine Dysentery and its Control]**. —*Ibid.* pp. 27–29.

I. *Balantidium coli* has been found in the wall and in the mucous membrane of the large intestines, and in the faeces of pigs affected with dysentery. The authors discuss the possibility that the organism is the cause of swine dysentery.

II. 97–100% recoveries were obtained in about 900 affected pigs treated with "osarsol", an organic arsenic compound. A special commission of the Sovyet Ministry of Agriculture confirmed these results and recommended "osarsol" for use in practice. Clinical symptoms, P.M. changes, and differential diagnosis of the disease are discussed.—A. MOLDAWSKY.

L'vov, N. S. (1940). Spirokhetoz svineĭ. **[Aetiology of Swine Dysentery]**.—*Sovyet. Vet.* No. 7. pp. 34–36.

L. maintains that this disease is primarily due to spirochaetal infection, but does not offer an opinion as to the species concerned. Certain protozoa, including *Balantidium coli*, can be demonstrated, but they are probably only secondary invaders. L. considers that the pathogenic action of *Bal. coli* in this condition is greatly exaggerated. He found that infection occurs by contact through infected premises and by means of food contaminated with faeces. By such exposure, 19 out of 25 piglets contracted the disease after an incubation period of 6–12 days, two showed only rise of temperature, and four remained unaffected. Subcutaneous inoculation of blood and emulsion of organs of diseased and dead animals failed to reproduce the disease. Recovered animals acquire a strong immunity. Treatment with arsenic in solution was effective.—A. M.

RAY, H. N., & RAGHAVACHARI, K. (1941). **Observations on *Babesia foliata* n. sp. from a Sheep.**—*Indian J. vet. Sci.* **11.** 239–242.

The individuals of this species of *Babesia* are leaf-shaped and occur mostly in couples in the centre of the erythrocytes, with their blunt extremities diverging from each other. Sheep infected with this parasite showed fever and marked anaemia. *B. foliata* is inoculable to sheep but not to goats.—S. K. SEN.

TSELISHCHEVA, L. M. (1940). Opyty perenosa teĭlerioza krupnogo rogatogo skota kleshchami Hyalomma (Koch, 1844). **[Experiments in Transmission of Bovine Theileriasis by Means of *Hyalomma* Ticks]**.—*Sovyet. Vet.* No. 11/12. pp. 31–35.

T. annulata infection was known to be transmitted in Kazakhstan by *H. detritum*, *H. savignyi*, and *H. asiaticum*. The author demonstrated that transmission is also effected by the two-host tick, *H. marginatum*, which was previously regarded as a non-transmittor. It was shown that the nymphs acquire infection which is transmitted by the adults. There is no passage of the parasites through the eggs. According to the author, the theileria survive in male ticks up to 1½ months and the males may also transmit the disease.

H. marginatum and *H. savignyi* were also found to transmit *T. mutans* which is rarely seen.—A. M.

REES, C. W., & AVERY, J. L. (1939). **Experiments on the Hereditary Transmission of Anaplasmosis by Ticks.**—*N. Amer. Vet.* **20.** No. 12. 35–36.

Adults of four species of ticks, *Dermacentor andersoni*, *D. nitens*, *D. variabilis*, and *Rhipicephalus sanguineus* were allowed to engorge completely on bulls clinically affected with, or known to be carriers of, anaplasmosis. The larvae, nymphs, and adults of the second generation were allowed to feed on susceptible cattle, with the exception of one experiment in which the larvae and nymphs of *R. sanguineus* were fed on rabbits. None of the cattle thus exposed showed any symptoms, nor could anaplasms be demonstrated in smears of their blood. After an interval of several months, the susceptibility of these cattle, as shown by the injection of *Anaplasma*-infected blood, was complete, all the animals developing severe clinical symptoms.

It was concluded that none of the species of ticks used was able to transmit anaplasmosis through the egg. This is in accord with the findings of other workers [see also ROZEBOOM *et al.*—*V. B.* **11.** 20].—E. S.

NÓBREGA, P., & REIS, J. (1941). Produção da vacina contra a espiroquetose aviária em ovos embrionados. **[A Vaccine against Fowl Spirochaetosis based on the Cultivation of *Spirochaeta gallinarum* in the Chick Embryo]**.—*Arq. Inst. biol., S. Paulo.* **12.** 87–92. [English summary].

The authors describe a vaccine prepared from chick-embryo culture of *S. gallinarum*; growth of the spirochaetes is at its maximum at the fifth day. 0·5% formalin is added to the ground-up suspension, kept for 24 hours in the ice-box, and the material is filtered and kept as a stock solution which is diluted for use. The authors claim that good immunity is produced by the vaccine.—MILLER WATSON.

GRAY, D. F. (1942). **Canine Leptospiral Jaundice in Queensland. II. Aetiology, Serology and Epidemiology.**—*Aust. vet. J.* **18.** 2–13. [For previous article, see *V. B.* **11.** 595].

In each of three cases of canine leptospirosis, the causal organism was shown to be *L. icterohaemorrhagiae*. The infection was probably derived from contact with rats, or with water from a rat-infested drain which was shown, by g. pig experiments, to harbour *L. icterohaemorrhagiae*. Of 14 rats (*Rattus norvegicus*) trapped where the first dog had apparently become infected, g. pig inoculation, microscopic examination of kidney sections, and serological tests showed that nine were infected.

The most certain method of isolating the organism was by intraperitoneal inoculation of suspected material into g. pigs of 100–150 g. live weight or, where the inoculum might be contaminated, by application to the depilated, lightly abraded skin of the abdomen. Temperatures of inoculated rats should be taken twice daily, a rise to 105°F. or higher being suggestive of infection.

Schuffner's medium, in which rabbit serum had been substituted for g. pig serum, was found to be satisfactory for artificial culture.

The microscopic agglutination test of Schuffner was found to be precise and easily interpreted.

—A. W. BANKS.

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

*Dittmann, J. (1941). Beobachtungen über das Auftreten von Aphthen und Sekundärinfektionen am Euter bei der Maul- und Klauenseuche. **[Observations on Foot and Mouth Disease Lesions of the Udder and on Lesions due to Secondary Infection].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 569].

91·2% of 234 cows with F. & M. disease had specific lesions on the udder, particularly on the teats (in 85% at the teat tip). Of 177 cases of udder infection 58 later contracted secondary infection [? pyogenic teat inflammation or mastitis] and 22 of them very severe udder complications.

Ratner, L. S., & Sirotkina, L. P. (1940). O nalichii dvukh immunologicheski razlichnykh tipov virusa yashchura na territorii SSSR. **[Existence of Two Immunologically Different Types of Foot and Mouth Disease Virus in the U.S.S.R.]**—*Sovyet. Vet.* No. 5. pp. 55–61.

This paper deals with the plurality of F. & M. disease virus, the authors disagreeing with the assumption that only the O type occurs in the U.S.S.R. Comparative studies were made with two newly isolated types, *viz*, the Kolpino, isolated from a cow at the Leningrad veterinary research station, and the Boenskiĭ, isolated at abattoirs from Bashkirian pigs by the All-Union Institut for Experimental Veterinary Medicine.

Using virus from 24-hour-old vesicles in a dilution of 1 : 100, the authors carried out cross-immunity tests in g. pigs, cattle, and pigs and showed that both types are immunologically different. The serum obtained from convalescent cattle possessed specific immune bodies only against the type by which they were infected. —A. Moldawsky.

Skomorokhov, A. L., Dubyanskiĭ, A. A., & Khomenko, N. A. (1939). Opyt likvidatsii yashchura primeneniem khloroformvaktsiny (" Inaktivir"). **[Experiences in the Eradication of Foot and Mouth Disease by the Use of the Chloroform Vaccine " Inactivir "].**—*Sovyet. Vet.* No. 9. pp. 41–43.

Single intracutaneous inoculation of doses varying from 0·1–0·5 ml., followed within 6–10 days by a subcutaneous dose of 1–5 ml. was carried out in 20 heavily infected areas. Of 1,185 inoculated animals in the areas, none became infected after they had had time to acquire immunity from the vaccination.

Preventive vaccination was performed on 11,143 animals. A specially appointed commission for checking these results confirmed that in infected areas in which the vaccinated animals were kept in close contact with affected animals, protection was established in 79·4–100% of cases, and those which became infected had the disease in a mild form. In infected areas, no new outbreaks occurred 14 days after the first vaccination and this enabled the quarantine period to be considerably shortened. In threatened areas, no outbreaks or other complications attributed to vaccination were observed.—A. Moldawsky.

Hofmann, W. (1941). Weitere Untersuchungen über den Neurotropismus des Maul- und Klauenseuchevirus. **[Further Research on Neurotropism of Foot and Mouth Disease Virus].**—*Zbl. Bakt. I. (Orig.).* **148.** 69–77.

This is a continuation of the work of Nagel [*V. B.* **9.** 238.] the same strain of type B virus being used. After the 140th intracerebral mouse passage, clinical symptoms began to appear in the mice and over 500 passages have now been carried out. Young mice weighing 16–20 g. are used and symptoms first appear 24–48 hours after inoculation. The mouse becomes dull, the coat ruffled and there is partial anorexia; 24 hours later the animals huddle in a corner with arched backs, breathing is accelerated, and paralysis of the hind legs develops. With some of the later passages death occurred at as early as 48 hours.

The virulence of the virus when tested by intradermal inoculation of the g. pig was greatly reduced, but it could be regained by passage with a corresponding loss of its neurotropic properties. The subcutaneous or intracerebral inoculation of the g. pigs with the neurotropic virus produced a characteristic disease with severe salivation but no epithelial lesions. The majority of the g. pigs died.—John Francis.

*Fogedby, E. F. (1940). Foreløbig Meddelelse om Dyrkning af Mund- og Klovesyge-Kulturvirus. **[The Cultivation of Foot and Mouth Disease Virus].**—*Maanedsskr. Dyrlaeg.* **52.** 425–427. [Abst. from abst. in *Tierärztl. Rdsch.* **47.** 204].

A discussion of the potential value of culture virus for the preparation of F. & M. disease vaccine. It appears that F. considers this quite feasible.

*v. Ardenne, M., & Pyl, G. (1940). Versuche zur Abbildung des Maul- und Klauenseuche-Virus mit dem Universal-Elektronenmikroskop. **[Foot and Mouth Disease Virus as Observed under the Universal Electron Microscope].** — *Naturwissenschaften.* pp. 531–532. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 215].

The cellular components were removed from virus-containing material from the lesions of infected g. pigs and the residual fluid, suitably diluted, was examined under the electron microscope. It was found that the virus particles were of low density and could not be easily differentiated from the surrounding film. The average diameter of these particles was 20–30 mμ, *i.e.* significantly greater than the figure obtained by ultrafiltration (8–12 mμ).—M. Landau.

Mason, J. H., & Neitz, W. O. (1940). **Erosive Stomatitis of Cattle.**—*Onderstepoort J. vet. Sci.* **15.** 159–173.

During the outbreak of foot and mouth disease in Natal in 1938, cases of two widely differing forms of stomatitis in cattle were encountered, not caused by the virus of F. & M. disease. One type in which there was a complete denudation of the superficial epithelium was termed " furry " or " scaly " tongue.

In the other condition, erosive stomatitis, the lesions had a faint resemblance to old F. & M. lesions. Symptoms of salivation were noted but no foot lesions were ever seen. Cattle under three years old were affected, but the lesions did not have the irregular jagged appearance of those of F. & M. disease, being circular and up to 4 cm. in diameter. The condition was found to be transmissible to cattle by scarification of the buccal mucous membrane, but no systemic symptoms were noted and no foot lesions occurred. The virus was filtered through Gradocol membranes and passed through those with an APD of 400 mμ.

Cultivation on the chorioallantoic membrane of fertile incubated eggs was successful. No success attended attempts to infect sheep. The virus survived for six weeks in scrapings dried from the frozen state and held at refrigerator temperature.—E. M. Robinson.

Kleine, F. K. (1940). Serumanwendung bei Rinderpest. **[The Use of Rinderpest Antiserum].**—*Z. ImmunForsch.* **99.** 48–52.

An historical note on the earliest use of con-

valescent and immune blood serum against rinderpest in South Africa, following KOCH's work there in 1897. —J. E.

PFAFF, G. (1940). **Rinderpest in Buffaloes.—The Immunizing Value of Dried Goat Spleen Vaccine.**—*Onderstepoort J. vet. Sci.* **15.** 175–184.

The experiments recorded were carried out because field inoculators had had to reduce the dose of the dried goat-spleen vaccine for buffaloes on account of severe reactions. Spread of the disease from vaccinated animals had been reported, and long-drawn-out reactions in them had occurred. In P.'s experiments it was found that the dose of goat-spleen vaccine had no influence on the reaction produced. No immunity was acquired by contact with reacting buffaloes. If the buffaloes were in good condition, the vaccine could be used with safety provided that the animals were well looked after and rested for at least 30 days after inoculation. It was considered that long-drawn-out reactions might have been due to infection soon after inoculation. —E. M. ROBINSON,

NAIR, K. S., KRISHNAMURTI, R., & KALYANASUNDARAM. G. S. (1941). **A Study on Goat Tissue Vaccine as an Immunizing Agent Against Rinderpest.**—*Indian J. vet. Sci.* **11.** 244–249.

Rinderpest goat spleen stored *in vitro* at temperatures between 83·8° and 86°F. was viable up to four days. Buffalo calves inoculated with 0·5–1·0 ml. of a 1% suspension showed severe reactions and 20% mortality. The same tissue virus preserved for 5–10 days under similar conditions was inert. From field trials the authors consider that immunization of highly susceptible cattle or buffaloes with goat-tissue virus alone is likely to produce undesirable reactions. —J. A. IDNANI.

SREENIVASAN, M. K. (1942). **Experiments on the Permeability of the Goat's Placenta to Rinderpest Virus.**—*Indian J. vet. Sci.* **12.** 45–47.

Spleen and/or heart blood from foetuses collected 4–8 days after artificial inoculation of goats was inoculated into susceptible bulls. In no case was rinderpest transmitted.—J. A. IDNANI.

*HJÄRRE, A. (1940). [**Equine Infectious Anaemia in Sweden**].—*50. Arb. Skand. Kreatursforsäkringsbolaget.* pp. 169–179. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 216].

According to H., vitamin B_1 deficiency predisposes to E.I.A. Amongst preventive measures recommended are improved pasture management and feeding, disuse of infected pastures, and killing of all virus carriers. Compulsory slaughter of all affected animals is advocated.—M. LANDAU.

STEIN, C. D., LOTZE, J. G., & MOTT, L. O. (1942). **Transmission of Equine Infectious Anemia by the Stablefly, Stomoxys Calcitrans, the Horsefly, Tabanus Sulcifrons (Macquart), and by Injection of Minute Amounts of Virus.**—*Amer. J. vet. Res.* **3.** 183–193.

A review is made of the literature dealing with this subject and four transmission experiments are described. "Source" animals were infected by subcutaneous or intravenous injection with a virulent strain of virus obtained from Wyoming during the 1941 outbreak of E.I.A. In three cases the disease was transmitted experimentally from the "source" animals by flies, once by stableflies and twice by horseflies. In addition, the disease was set up in susceptible horses by the subcutaneous injection of virus diluted 1 : 1,000, by 21 subcutaneous punctures of the skin with an infected hypodermic needle, and also by the subcutaneous injection of a suspension of the mouth parts of infective horseflies. In these experiments the incubation period of the disease varied from 10–25 days. There are three tables and six temperature charts.—J. C. BUXTON.

*MÉDYNSKI, C. (1941). Notes cliniques sur la récente épizootie de maladie typhoide du cheval. [**Clinical Notes on the Recent Outbreak of Equine Influenza**]. —*Bull. Acad. vét. Fr.* **14.** 89–93. [Abst. from abst. in *Tierärztl. Rdsch.* **48.** 84].

The disease occurred in army and in farm horses [presumably in France]. The chief symptoms were swelling of the limbs, colic, gallop movements in lateral recumbency, eye changes, and in stallions swelling of the penis and sheath. P.M. changes resembled those of an intoxication. High fever lasted for 18–20 days: in some cases sudden death (syncope) occurred soon after its subsidence. Haematological tests revealed severe anaemia and leucopenia with a greenish serum. Convalescent blood therapy gave good results in early cases, and it is claimed that heated "salmonella cultures" did likewise.

FRANCIS, J. (1942). **A Review of the Respiratory Diseases of the Horse.**—*J. R. Army vet. Cps.* **14.** 5–16.

F. reviews the literature, with special reference to distinguishing symptoms and to aetiology, on the respiratory diseases of the horse. Contagious pneumonia is stated to be a distinct entity, but there is a lack of proof that influenza, infectious respiratory catarrh, and strangles are entirely distinct: it is possible that strangles, like the other two, is associated with a filtrable virus, as suggested by recent German research.

F. concludes by emphasizing the need for fresh research, should the opportunity arise in the present war, to study equine respiratory diseases in army horses.

[Classification and synonymy of the equine respiratory diseases is still problematical. Below is a table of the more commonly used English, French, and German names of the four main disease designations.

English	Strangles	Influenza Pink Eye	Contagious pneumonia	—
French	Gourme	Fièvre typhoide	Grippe equine	Bronchite infectieuse
German	Druse	Pferdestaupe Rotlaufseuche	Brustseuche	Ansteckende Katarrh der Luftwege Hoppegartener Husten Brüsseler Krankheit
Latin	Coryza contagiosa equorum	Influenza catarrhalis	Influenza pectoralis	Laryngo-tracheo-bronchitis equorum

Note: *Brüsseler Krankheit* (*Genter Krankheit*) is really the bacterially complicated form of *ansteckende Katarrh.* Many other names have been used, some for more than one of these diseases: it does not appear profitable to list them. This table is a correction of one previously published (see *V. B.* **7.** 222).—Ed.] —J. E.

PARDUBSKY, K. (1939). Další x příspěvek k chripce koní. **[Notes on Equine Influenza].**—*Zvěrolék. Obz.* **32.** 317–320.

A description of some cases of equine influenza which were considered to have developed from the latent state as a result of lowered resistance caused by long journeys, unsuitable weather, and surgical operations.—O. SPIRMANN.

MOHLER, J. R. (1942). **Report on Infectious Equine Encephalomyelitis in the United States in 1941.** pp. 8. Washington, D.C.: U.S. Department of Agriculture, Bureau of Animal Industry. [4to].

This is a detailed statistical report. 36,872 cases were reported, the great majority in the Middle West (Minnesota, Missouri, Iowa). Eastern states were spared. A map shows the type of E.E. in each state as far as is yet known. The morbidity rate average for the whole country was 0·6% in horses and mules and the mortality rate among affected animals 28%.

About half a million equine animals were vaccinated with formolized chick-embryo vaccine. Its application could not be sufficiently controlled to enable a good judgment of its effect to be made, but reports stated that only 213 vaccinated animals contracted the disease. —J. E.

SHAHAN, M. S., & CREECH, G. T. (1942). **Notes on Susceptibility of the Golden Hamster (Cricetus Auratus) to Equine Encephalomyelitis Virus.**—*Amer. J. vet. Res.* **3.** 193–194.

E.E. is shown to pursue the same course in golden hamsters as in g. pigs. Dilutions of the third generations of an Eastern and a Western strain of the virus were injected intracranially and subcutaneously into eight young female hamsters, four being used for each strain. Symptoms appeared in all cases within four days and the animals either died or were killed up to the sixth day. No specific differences between the two strains of virus were observed either clinically or pathologically. —J. C. BUXTON.

GRAHAM, R., & LEVINE, N. D. (1942). **Studies on Equine Encephalomyelitis. II. A Non-antigenic Strain of Pigeon-Brain Virus.**—*Amer. J. vet. Res.* **3.** 42–44. [For part I, see *V. B.* **12.** 447].

LEVINE, N. D., & GRAHAM, R. (1942). **Studies on Equine Encephalomyelitis. III. Non-Pathogenicity for Chicks of Western Equine Encephalomyelitis Virus.**—*Vet. Med.* **37.** 116–117.

II. A formolized pigeon-brain vaccine was prepared from a highly virulent strain of Western E.E. virus. It failed to protect g. pigs against intracranial inoculation of homologous pigeon-brain virus. It would seem, then, that virus concentration *per se* is not the only essential index of the antigenic properties of inactivated E.E. tissue virus.

III. Two different strains of Western E.E. virus were used in experiments in which 48 chicks of 2–3 weeks old were inoculated by the intracerebral, subcutaneous, or intraperitoneal route, with varying dilutions of pigeon-brain tissue suspension. All the chicks were found to be refractory to infection. Pigeons inoculated with much smaller doses of the same suspension invariably succumbed.—ISOBEL W. BURTON.

SCHWARZMAIER, E. (1941). Die Haltbarkeit des über Chlorkalzium im Vakuum getrockneten Bornavirus. **[Viability of Borna Disease Virus Conserved over Calcium Chloride** *in vacuo*].—*Berl. Münch. tierärztl. Wschr.* March 21st. 143–144.

Borna disease virus in the form of infected brain dried *in vacuo* over calcium chloride has been found to remain fully virulent for seven years if kept cool and in darkness; it only survives, however, for another year or two beyond that period.—J. E.

—. (1939). **Epidemic Encephalitis. Etiology—Epidemiology—Treatment. Third Report by the Matheson Commission.** pp. viii+493. New York: Columbia University Press. [8vo] [19s.]

This report is a most important contribution to the literature of epidemic encephalitis. The first report was published in 1929, and the second in 1932. Over a half of each report consists of a bibliography. In the first two reports little was given about encephalomyelitic conditions in animals, but in the third equine encephalomyelitis is dealt with and there is brief mention of "louping ill" infection in man. [The recognition that antibodies to the St. Louis encephalitis virus of human beings can be found in horses in affected areas in the U.S.A. and that the horse may be a source of human infection is an important development since the issue of this third report.] No mention is made of swineherds' disease. To those working on epidemic infections of the central nervous system these three reports are of great value.—W. A. P.

GLAMSER, F. (1941). Ueber die Tollwut im Generalgouvernement Polen. **[Rabies in the "General Gouvernement", Poland].**—*Berl. Münch. tierärztl. Wschr.* Jan. 24th. 37–41.

A review of the rabies situation in Poland since before the war of 1914–18 up to the present day. Between 1933 and 1939 it was increasing (3,228 affected localities and 6,434 human exposures to infection in 1938), particularly in the provinces of Lwow (Lemburg), Krakow, Warsaw, Lublin, and Tarnopol. Since the outbreak of war in 1939 the Warsaw area has been very heavily affected, 500 cases being observed in animals in less than one year (385 in dogs). The chief cause was the large dog population plus the effect of war.

Some interesting figures on incubation periods are given, *e.g.* in cattle, incubation periods of 23–71 days have been observed, and in dogs periods of up to three months. Between January and October 1940, 1,438 persons were attacked and probably infected: Pasteur treatment was applied to all, either by Pasteur vaccine or by the Semple-Fermi carbolized vaccine.

The current German control method for rabies is described: it aims at the extermination of the chief menace—the errant dog.—J. E.

PALLASKE, G. (1941). Tollwut bei wildlebenden Fleischfressern. **[Rabies in Wild Carnivores].**—*Berl. Münch. tierärztl. Wschr.* Oct. 17th. 501–502.

A record of the laboratory diagnosis of rabies in seven foxes in eastern Germany (Grenzmark). Three were killed on farmsteads and the rest were found dead. —J. E.

*EMANUILOFF, I. (1940). **[Epithelial Inclusions in the Brain Stem and the Diagnosis of Rabies in Horses].** —*Yearb. vet. med. Fac., Sofia.* **16.** 79–87. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 176]. [German version in *Z.InfekKr. Haustiere.* **58.** 105–110].

Smears, obtained by squeezing on to slides sections of Ammon's horn, were stained by Gerlach's method and showed accumulations of small cells with bright red inclusions in their cytoplasm. These cells had been torn from the epithelium of the choroid plexus of the lateral ventricles. The inclusions in them proved of nonspecific nature.

In order to avoid confusing these cells with ganglion cells and the inclusions with Negri bodies E. prefers to take light impression smears in which ganglion cells and epithelial cells remain clearly separated.—M. LANDAU.

DAMON, S. R., & SELLERS, T. F. (1941). **A Note on the Probability of Error in the Diagnosis of Rabies by Microscopic Search for Negri Bodies.**—*J. Lab. clin. Med.* **27.** 71–74. [Also appeared in *Vet. Med.* **37.** 253–255].

The records were studied of the diagnostic laboratories of the State Department of Health of Alabama for the years 1937–39, and of the Georgia Department of Health for 1937. It was found that in Alabama, out of a total of 1,024 specimens diagnosed as negative for rabies on microscopic examination, 127 (12·4%) were positive on mouse inoculation. In the same period, 269 specimens were found to be positive on microscopic examination, but 11 (4·1%) of these were negative to the mouse inoculation test.

In Georgia, of 507 specimens passed as negative after microscopic examination, 62 (12·2%) proved positive to the mouse test, while out of the 237 specimens found positive on microscopic examination, 6 (2·5%) were negative to the inoculation test.

An attempt is made to explain these contradictions. —M. H. KYAW.

HAMPIL, B., & ROBERTS, G. H. (1942). **Investigations on the Immunogenic Properties of Fixed Rabies Virus Strains.**—*J. Bact.* **43.** 397–407.

The value of a live vaccine from 17 strains of fixed rabies virus, collected from various laboratories, was studied with regard to their immunizing power against homologous strains. Groups of mice were given graded dilutions of virulent brain suspension intraperitoneally and the survivors were tested for immunity three weeks later by intracerebral inoculation of graded doses of homologous virus.

The authors claim that their technique enabled differences to be detected in the immunogenic value of the strains, which would have been missed had more simple methods been used. The 17 strains were found to vary greatly in immunizing power, about half failing to protect against more than 10 M.L.D. It is thus important to eliminate unsatisfactory virus strains from vaccine manufacture by the use of a mouse potency test such as that described.—M. H. KYAW.

JOHNSON, H. N., & LEACH, C. N. (1942). **Studies on the Single Injection Method of Canine Rabies Vaccination.**—*Amer. J. publ. Hlth.* **32.** 176–180.

The authors had previously compared chloroform- and phenol-treated virus for the single vaccine method against canine rabies [*V. B.* **11.** 366, and **12.** 23.]; the concentration of rabid brain tissue was 33·3% in the former and only 20% in the latter vaccine. In the present study both forms of preparation were identical in virus concentration (33·3%), 1% chloroform and 0·83% phenol being used to inactivate the virus. The methods of preparation from sheep and horse brain respectively are detailed. It was decided to test whether freezing and drying *in vacuo* might obviate the necessity of refrigerator storage of the chloroform-treated vaccine.

There was no difference between the two inactivating agents when the tissue concentration was the same, but freezing and drying of the chloroform vaccine reduced its antigenicity. A test dosage of 0·5 ml. of a 10% suspension of rabid dog brain into each masseter muscle was found to give consistent mortality results, but the necessity is stressed of the number of animals in such experiments being sufficient to avoid chance error.—C. V. WATKINS.

WEBSTER, L. T., & CASALS, J. (1942). **An Improved Non-Virulent Rabies Vaccine.**—*Amer. J. publ. Hlth.* **32.** 268–270.

Details of the preparation of the vaccine are given. It differs essentially from other methods in exposure of the virus suspension to ultra-violet light for 35 minutes.

Four kinds of test, three on mice and one on dogs, proved that this irradiated vaccine is superior to other vaccines now on the market for immunizing mice and dogs against rabies.—M. H. KYAW.

PLOTZ, H., & REAGAN, R. (1942). **In vitro Cultivation of the Street Virus of Rabies.**—*Science.* **95.** 102–104.

"Street" virus was successfully cultivated direct from the brain of a human case of rabies as well as from the brain of a rabid dog. The two strains of virus were then successfully subcultivated 11 and nine times respectively, the virulence of the strains for mice increasing with transplantation.

The culture medium consisted of 3 ml. of Tyrode's solution and 0·5 ml. of unfiltered monkey serum to which were added four drops of a ten-day-old whole chick embryo suspension. The inoculum was 1·0 ml. of the supernatant fluid obtained by centrifuging a 10% acqueous suspension of the brain at 1,200 r.p.m. for 10 min.—M. H. KYAW.

ROSENBERGER, G. (1940). Beobachtungen über die Aujeszkysche Krankheit in Deutschland. [**Aujeszky's Disease in Germany**].—*Dtsch. tierärztl. Wschr.* **48.** 485–488.

During the 12 years 1925–37, Aujeszky's disease was diagnosed in eight animals at the Hanover clinic. References are also given to the recent German literature on the disease.

The clinical picture [six illustrations given] is so characteristic that diagnosis is usually easy. The course is more rapid than in rabies, the trigeminal paralysis and the aggressive behaviour being absent. 3–6 days after the subcutaneous or intramuscular inoculation of infected material into rabbits, symptoms of itchiness, cramp, and later paralysis appear, and the animal usually dies within 24 hours. Diagnosis by animal inoculation is not, however, entirely satisfactory as a negative result cannot be relied upon. It is not known why all of a number of inoculated animals do not become infected or why in a large herd of cattle only one may be infected. The disease must be differentiated from cerebral or meningeal TB., tetanus, and acute lead poisoning.

When once the diagnosis has been established, the animal should be slaughtered and precautions taken to prevent further infection.—JOHN FRANCIS.

LUKASHEV, I. I., & ROTOV, V. I. (1939). Materialy k epizootologii bolezni Aueshki. [**Epizoology of Aujeszky's Disease**].—*Sovyet. Vet.* No. 7. pp. 51–54.

Outbreaks which occurred in different farms in the Ukrainian S.S.R. are surveyed. The disease tends to recur on the same farms and to spread to neighbouring districts. The incidence was most common amongst pigs, and considerable losses were observed among young animals. In adult pigs the disease took a benign course, often without symptoms. The serum of such animals showed viricidal properties and neutralized the virus *in vitro*. The disease was also observed in dogs, cats, cattle, and horses which had been in close contact with pigs. In cattle, the course was severe and fatal. The incidence was more common during the autumn and winter months, probably due to overcrowding and exposure and to contact with rodents. On one farm, the virus was isolated from dead mice. It is supposed that affected pigs and cattle spread the virus through the nasal discharge.

Artificial infection with brain emulsion from an infected rabbit was carried out in seven pigs of 3–4 months old; infection by ingestion or subcutaneous inoculation set up a mild form of the disease, whereas intranasal instillation with previous scarification of the mucous membrane provoked a severe form. Rabbits

were infected by subcutaneous inoculation with nasal discharge and urine of an experimentally infected piglet.

Suggested control measures include the recommendation that Aujeszky's disease be included in the list of notifiable diseases.—A. MOLDAWSKY.

MASON, J. H., & NEITZ, W. O. (1940). **The Susceptibility of Cattle to the Virus of Bluetongue.**—*Onderstepoort J. vet. Sci.* **15.** 149–157.

As a result of some experiments which they had made on an erosive stomatitis condition in cattle, the authors attempted to confirm the work of BEKKER, DE KOCK, & QUINLAN [*V. B.* **5.** 75.] on bluetongue in cattle. No success was obtained in producing a recognizable disease in cattle by infection with bluetongue virus. In four experimental animals insignificant lesions appeared in the mouth, and it was considered that the scarification adopted in setting up the infection played a big part in the production of the erosions which were very small. The only definite conclusions which could be drawn were that bluetongue produces an inapparent disease in cattle and that the virus can be demonstrated in their blood for 29 days but not much longer after inoculation. It was admitted, however, that a virus which had been passaged 14 times was used, and that this might have been responsible for the differing results.—E. M. ROBINSON.

DEKATEREV, N. A. (1939). Infektsionnaya pnevmoniya koz. **[Infectious Pneumonia of Goats].**—*Sovyet. Vet.* No. 8. pp. 47–48.

The disease, which is probably caused by a filtrable virus, is characterized by nasal discharge, cough, and emaciation, and it may take an acute or chronic course. Goats alone were found to be susceptible to contact infection, the incubation period being from 4–6 days. Artificially, the disease may be transmitted by intrapleural inoculation of emulsion from lungs, liver, and lymph nodes. The subcutaneous inoculation of laboratory animals failed to reproduce pneumonia; the animals succumbed within 12–18 hours showing signs of intoxication. At P.M. examination, lesions of catarrhal and purulent pneumonia are observed, with haemorrhagic changes in the bronchial and mediastinal l.nn. The pleura is only occasionally affected. Blood examination revealed a decrease in haemoglobin and red blood corpuscles and the appearance of young forms of leucocytes.—A. MOLDAWSKY.

BAKER, J. A. (1942). **A Filterable Virus from Pneumonia and Diarrhea of Calves.**—*Cornell Vet.* **32.** 202–204.

B. describes an infectious disease of calves, recognized clinically by fever, diarrhoea, and pneumonia. The disease exists all the year round, being more severe in late winter and early spring. P.M. lesions noted were catarrhal enteritis and a patchy bronchopneumonia confined to the anterior lobes of the lungs.

B. isolated an organism which produced pneumonia in white mice when inoculated intranasally. From the pneumonic lungs of white mice he obtained a filtrable agent which reproduced the disease in calves when inoculated intranasally. In two experiments, B. claims to have transmitted this disease to normal calves by keeping them in contact with experimentally infected calves. Serum from calves recovered from natural infection protected mice against experimental infection. No details are given of the experiments carried out.
—M. H. KYAW.

*SCHNEIDER, K. (1941). Untersuchungen über den Verlauf und die Verbreitung der Schweinepest im Land- und Stadtkreis Hannover während des Seuchenganges 1939/40. **[Swine Fever in and around Hanover during the Outbreak of 1939-40].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 569].

Epidemiological notes about the outbreak are given. About half the affected herds had acute, and half chronic, S.F. Four herds were infected by human virus transmitters coming from already infected herds.

*ALEGREN, A. (1940). **[The Swine Fever Outbreak in Sweden in 1940].**—*50. Arb. Skand. Kreatursforsäkringsbolaget.* pp. 141–147. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 216].

Statistics covering this outbreak show that in 19·8% of cases infection was spread by the feeding of swill, in 66·81% by the purchase of infected animals, and that in 13·36% of cases the method of infection remained obscure.—M. LANDAU.

DE KOCK, G., ROBINSON, E. M., & KEPPEL, J. J. G. (1940). **Swine Fever in South Africa.**—*Onderstepoort J. vet. Sci.* **14.** 31–93.

During the years 1903–18, a number of outbreaks of what appeared to be the European type of S.F. occurred in South Africa. In 1926, a type of S.F. was diagnosed in the Transvaal which very closely resembled that described by MONTGOMERY in Kenya, and it was associated with the presence of warthogs. The disease was always of a very acute type and was characterized by the occurrence of haemorrhages in most organs, especially in the periportal lymph nodes. Very extensive outbreaks occurred in the Western Cape Province in 1934–35 and smaller ones about the same time in the Johannesburg area. These formed the basis of the experimental work described in this paper. The pathological changes resembled those described by SEIFRIED, GEIGER, and others in acute cases of the European disease, but were in general more marked. Some indication was obtained that there was an antigenic relationship between the viruses of the European and African types of S.F. No success attended efforts to transmit the disease to laboratory animals. In a number of cases, blood from warthogs in certain areas of the Transvaal where S.F. occurred was found to be infective for pigs. Recovered pigs were shown to be carriers in some cases even ten months after recovery. Complication with either *Salmonella cholerae-suis* or *Pasteurella suiseptica* occurred in some cases, but outbreaks of a disease resembling S.F. in which the virus was not found but in which there was infection with *S. cholerae-suis*, were met with in the Johannesburg area and were apparently pure paratyphoid infections.

Appendixes are given with details of the experimental work and regulations for the control of the disease introduced as a result of the extensive outbreak in the Western Cape Province.—E. M. ROBINSON.

HIRT, G. (1939). Sertéspestisvirussal hyperimmunizált sertések lép-, máj-és nyirokcsomójában található szöveti elváltozások, különös tekintettel a reticuloendothel sejtekre. **[Histological Changes Found in the Spleen, Liver and Lymph Nodes of Pigs Hyperimmunized with Swine Fever Virus].**—*Állatorv. Lapok.* **62.** 142–149.

The experiments reported show alterations in the spleen, liver and portal lymph nodes in hyperimmunized pigs. Animals of the first group which received one intravenous injection of virulent defibrinated blood were killed and examined at intervals (10 min. to 13 days). The organ changes noted were as follows:—in the first two hours haemolysis and the presence of red blood corpuscles in the reticulo-endothelium (R.E.) of the spleen; after one day r.b.c. were seen in the Kupffer cells of the liver; on the fourth day hyperplasia of the Malphigian bodies of the spleen and of the lymph nodes

and haemosiderin deposits in the R.E. of all three organs; between the seventh and tenth days increased hyperplasia of the spleen, and considerable pigmentation of the liver and lymph nodes; from the tenth day onwards the spleen returned towards normal, but the lymph nodes were still swollen. At this stage pigmentation by haematoidin remained considerable only in the liver.

The second group of pigs was hyperimmunized by repeated intramuscular injections and was examined ten days after the last injection. The spleen showed hyperplasia and induration, the liver pyknosis of the nuclei, and the lymph nodes hyperplasia without induration. There was no abnormal pigmentation.

The third group of pigs was hyperimmunized by repeated intravenous injections and was examined 14 days after the last one. All changes noted in the second group were present and in addition there were changes in the outer and middle coats of the larger blood vessels of all three organs. The spleen was much enlarged, the central veins of the liver were dilated, and the lymph nodes chronically indurated and hyperplastic. All three organs were pigmented. Further experiments are necessary to determine whether the lesions were due to the injections of the defibrinated blood or to the virus.
—J. Csonka.

I. Andreev, P. N. (1940). Prizhiznennaya diagnostika chumy svineĭ posredstvom ksenoreaktsii. [**Diagnosis of Swine Fever in the Living Animal by means of a Modified Allergic Test**].—*Sovyet. Vet.* No. 7. pp. 22–24.

II. Andreev, P. N., & Kosarev, M. G. (1940). Opyt primeneniya ksenoreaktsii dlya prizhiznennoĭ diagnostiki chumy svineĭ v usloviyakh svinovodcheskikh khozyaĭstv. [**Allergic Tests in the Diagnosis of Swine Fever in Breeding Farms**].—*Sovyet. Vet.* No. 7. pp. 24–26.

I. A. describes the allergic test originally recommended by Sarnoviec and subsequently modified by Donatien & Lestoquard [*V. B.* **8.** 436].

II. The above allergic test was used under field conditions on three groups of pigs. The first group consisted of 29 suspects which had received doses of therapeutic serum on the previous day; the second group contained ten young pigs isolated as suspects which had received serum ten days previously, and the third, six young pigs which had undergone simultaneous inoculation 18 days previously. Five different antigens were used, prepared from formalinized blood of acute cases and of dead animals, from urine, and from a strain of highly active virus obtained from the Kashintsev serum laboratory. All antigens were diluted with equal parts of castor oil.

It was found that of pigs from the first and second groups, which were tested with antigen prepared from the local virus, only 20–34·4% reacted, whereas all six pigs of the third group, which were tested with the Kashintsev virus, reacted positively. The fact that only some of the suspected pigs from the first and second groups reacted is, in the authors' opinion, probably due to different individual response of animals and different antigenic properties of the virus.

It is concluded that the allergic test may be used in doubtful cases as a diagnostic aid when used for groups consisting of 10–12 animals. It is also recommended that allergen be prepared from acute cases and that fine-skinned animals be selected for testing.—A. M.

Ježić, J., & Zeljko, M. (1940). Daljnji pokusi Dorsetovom vakcinom protiv svinjske kuge. [**Experiments with Dorset's Vaccine against Swine Fever**].—*Jugoslov. vet. Glas.* **20.** 16–21. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 306].

Seven batches of vaccine were inoculated into 376 pigs without adverse reactions. Some months later the pigs resisted natural or artificial infection.

Michalka, J. (1942). Tollwut beim Schwein. Beitrag zur Differentialdiagnose der ansteckenden Schweinelähmung. [**Rabies in Swine and its Differentiation from Porcine Encephalomyelitis**].—*Wien. tierärztl. Mschr.* **29.** 12–15.

A discussion on the differential diagnosis of rabies and porcine encephalomyelitis, based on an atypical case of rabies in a pig. Although the pig became fierce it became paralysed in a manner usual in P.E. and no Negri bodies were demonstrable in the brain. Rabies was, however, diagnosed by animal inoculation.

The case history and incubation period are important for differential diagnosis, as unless brain sections show Negri bodies, the two diseases cannot be differentiated histologically, each being a non-purulent polioencephalomyelitis. P.E. usually occurs in many pigs in an outbreak and rabies occurs sporadically, whilst the incubation period in P.E. is 3–30 days and in rabies one week to several months.—J. E.

Jansen, J. (1941). Tödliche Infektionen von Kaninchen durch ein filtrierbares Virus. [**A Fatal Virus Infection of Rabbits**].—*Zbl. Bakt. I.* (*Orig.*). **148.** 65–68.

J. describes a spontaneous outbreak of an acute fatal disease in rabbits. The only P.M. lesions were numerous, light coloured spots in the liver. A cultural examination of tissues was negative, but the disease was transmitted by the subcutaneous inoculation of liver-tissue suspension. Death occurred 6–8 days after inoculation, preceded, as in the natural disease, by 1–2 days of anorexia and listlessness. The faeces were soft and there was an oedematous swelling at the site of inoculation. The liver lesions of the naturally occurring disease were observed and there was also swelling of the spleen. Passage experiments were carried out using tissue suspensions and filtrates.—John Francis.

Albiston, H. E., & Gorrie, C. J. R. (1942). **Newcastle Disease in Victoria.**—*Aust. vet. J.* **18.** 75–79.

Two outbreaks, in 1930 and 1932, are described. They were controlled by a drastic slaughter policy. Fowls were principally affected, although turkeys were found to be susceptible. Geese and ducks showed marked resistance to natural infection. When the disease was allowed to run its course, the mortality rate was 50–100%. Clinical and P.M. appearances are described.

Cross-immunity tests with virus from the second outbreak indicated its identity with that of Newcastle disease.—A. W. Banks.

Bub. (1942). Pferde-Pocken. Variola equina. [**Horse Pox**].—*Z. Veterinärk.* **54.** 137–141.

An account of an outbreak in nearly all of 130 French horses sent to a horse hospital in Germany. It was a fever-free exanthema of the mouth, first indicated by abnormal ropy salivation. Pox-like nodules formed both inside and outside the mouth, especially on the tongue, and developed into pocks and later craters. The course of the disease was 2–3 weeks. In four horses lesions appeared also on the face (cheeks, nasal region, and eye region). Differential diagnosis is discussed and symptomatic treatment described.

Three persons contracted finger lesions with lymphangitis of the arm after handling affected horses; healing under treatment was uneventful.—J. E.

Angeloff, S. (1940). Die Schafpocken in Bulgarien. [**Sheep Pox in Bulgaria**].—*Dtsch. tierärztl. Wschr.* **48.** 385–388.

This is a good general review on sheep pox with

special reference to its history and incidence in Bulgaria. It is the most important infectious disease of the most important farm animal in that country and has existed there for a long time, except for short periods in the last three decades when it was eradicated, only to return from adjacent countries.

A. reviews the known facts, some of which are controversial, about the disease and its virus and makes the following points. Sheep-pox virus passes through rather coarse filters and produces inclusion bodies. It withstands heat badly and cannot even survive at 48°C. This temperature was reached in a large centrifuge used for the preparation of sensitized virus vaccine. The virus died unexpectedly and another cooler-running machine had to be obtained. Glycerin is a very bad virus-conserving agent, but 3% boric acid, "sunoxol" (1 : 2,000), and 1–2% chinosol are all good in this respect. The virus can be cultivated in the developing egg, but loses its virulence after passage. No plurality of strains has been demonstrated, though changes in potency are prone to occur in experimental strains. Attempts to infect with sheep-pox virus horses, cattle, buffaloes, mice, g. pigs, and rabbits have all failed, but goats and pigs could be infected experimentally. Man is not susceptible to sheep pox, judging from Bulgarian experiences of persons whose work has exposed them to infection.

Natural infection in sheep occurs through the skin or respiratory system, but not perorally. Acquired immunity is life-long and the blood of immune sheep contains both virus-neutralizing and complement-fixing antibodies.

The macro- and micro-pathology of sheep pox is described.

The disease is controlled in Bulgaria by compulsory notification, isolation of infected flocks, local "stand-still" orders, slaughter of affected sheep while the outbreak is in its early stage, and suitable prohibition of movement of sheep in appropriate areas. Farmers are compensated for sheep killed in this stamping-out method. If this fails to stop the disease spreading emergency inoculation is carried out on threatened flocks by the "ovination" method, in which the sheep are inoculated intradermally with artificially induced sheep-pox lymph diluted 4–5 times with 3% boric acid. This method was used on over 4½ million sheep in Bulgaria between 1909 and 1931. 96% of all these sheep were satisfactorily immunized.

For immunization under less urgent conditions, a sensitized vaccine, consisting of a mixture of virus and antiserum, has been much used, over 250,000 sheep being so treated between 1935 and 1939. The mode of preparation is described. Other types of vaccine which have not proved sufficiently satisfactory in practice include virus treated with formalin, aniline dyes, crystal violet or brilliant green, and heterologous pox virus.—J. E.

*Iwanoff, X. (1940). **[Pathology of Sheep Pox with Special Reference to Atypical Pox].**—*Yearb. vet. med. Fac., Sofia.* **16.** 413–538. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 214].

The author recognizes the following forms of cutaneous sheep-pox :–(1) verrucoid papules, resembling ordinary papillomas ; (2) urticaria-like papules or plaques, only distinguishable from typical urticaria by microscopic examination ; (3) pelliculated papules, covered by a membrane of necrotic epithelium which, when stripped off, leaves a raw, ulcerating surface, and (4) vesiculated papules, where the papules are transformed into small vesicles filled with a serous fluid, cell debris and leucocytes.—M. Landau.

*Petrin, S. (1941). Ueber Melkerknoten. **[Milkers' Nodules].**—*Med. Klinik.* 351–353. [Abst. from abst. in *Zbl. Bakt. I. (Ref.).* **140.** 181].

A record of two cases in Styria, Austria. Smallpox vaccination had been carried out in the district a short time before and it was thought possible that cows had become infected with the lymph and so caused milkers' nodules in the two milkers.

[It appears that hand lesions which usually affect milkers and are called "milkers' nodules" may be caused by various viruses of the pox group and may be transmitted to human beings both from cows and other domestic animals such as sheep [see *V. B.* **6.** 357]. The aetiological nature was recently discussed by Becker and by Norozov [*V. B.* **12.** 90 and 215.] and also by Findlay in Doerr & Hallauer's "Handbuch der Virusforschung" (1938. Vienna : Julius Springer.)] —J. E.

Lea, D. E., & Salaman, M. H. (1942). **The Inactivation of Vaccinia Virus by Radiations.**—*Brit. J. exp. Path.* **23.** 27–37.

A description is given of experiments in which this inactivation of vaccinia, by means of α, X, and γ-rays, was measured by intradermal inoculations of serial dilutions in rabbits. It is believed that the inactivation is due to a single ionization in a sensitive constituent of the virus, and reasons are advanced for identifying this with the genetically important part of the virus. Calculations suggest that this sensitive material comprises only 0·5% of the total bulk of the virus particle, in contrast to the small plant viruses and bacteriophages in which it occupies a large part, perhaps the whole of the particle. Some calculations are given of the number, size and distribution of the genes in the vaccinial particle.

Vaccinia, it is concluded, should be regarded as a complex of genes and genetically inert material, comparable with unicellular organisms and higher forms of life, in contrast with the smallest virus particles which are regarded as naked genes.—Alfred Eden.

Wittfogel, H. (1941). Ueber neuere Methoden der Erforschung von Viren bei Mensch und Tier. **[New Research Methods for Human and Animal Viruses].** —*Arch. wiss. prakt. Tierheilk.* **77.** 119–126.

A brief general review of the progress of virus research. No new work is described.—J. E.

Cooke, B., & Best, R. J. (1941). **The Inactivating Effect of Salicylate on Suspensions of Some Animal Viruses. (Herpes, Infectious Myxoma, Shope Fibroma, Vaccinia, Poliomyelitis).**—*Aust. J. exp. Biol. med. Sci.* **19.** 93–99.

In all cases the viruses used were prepared from glycerinated tissues less than three weeks old ; a 10% suspension was made in physiological saline, and centrifuged at 2,000 *g.* for 15 min. They were rapidly inactivated by contact with solutions of potassium salicylate at pH 7 at 22°C.

For Shope fibroma virus the rate of inactivation was shown to be logarithmic ; it is pointed out that complete mathematical inactivation can therefore occur only in infinite time, and a distinction is drawn between this and biological inactivation, which latter was the end-point measured in the experiments.

The limiting concentrations of salicylate for biological inactivation after 24 hours' contact were defined very precisely for herpes virus at 0·15 M, for Shope fibroma and vaccinia viruses at approximately 0·7 M, and for virus myxomatosum at about 1·0 M. Poliomyelitis virus was not tested for partial inactivation, but complete inactivation was not brought about even by higher concentrations.

When the salicylate was removed from inocula by dialysis immediately before inoculation, it was found that higher concentrations were needed for complete inactivation of Shope fibroma and vaccinia viruses. Salicylate had an inhibiting effect on the diffusion (Duran-Reynals) factor with testicular virus suspensions, which may partly account for the effect of salicylate at the site of inoculation.

Salicylate-treated virus myxomatosum was not an effective immunizing agent.—A. W. BANKS.

FREEMAN, G. (1941). **Lack of Immunity to Latent Virus.**—*Proc. Soc. exp. Biol. N.Y.* **48.** 568–570.

This virus, which has been found to occur naturally in mice and was first described in 1938 [*V. B.* **8.** 643.], remains latent until provoked experimentally; it then becomes highly virulent, all affected mice dying. The disease could be produced by the serial intranasal inoculation of lung tissue and sometimes even by the intranasal inoculation of saline. Mice that did not sicken as a result of the experimental interference were not subsequently immune to the intranasal inoculation of virus. Groups of mice were inoculated with virus by various routes in an unsuccessful attempt to immunize them. An attempt to produce immune serum in rabbits also failed.—JOHN FRANCIS.

GÖNNERT, R. (1942). Ueber einige Eigenschaften des Broncho-pneumonievirus der Maus. **[Some Properties of the Broncho-Pneumonia Virus of the Mouse].** —*Zbl. Bakt. I.* (*Orig.*). **148.** 331–337.

A specific virus disease with typical changes in the lungs is described. Red-violet inclusion bodies 200 mμ in diameter were observed in Giemsa-stained preparations. With a lung suspension diluted 10^{-5}–10^{-7}, death was produced following intranasal inoculation, but infection could not be produced in mice inoculated by any other route. In severely affected mice, virus was detected in the heart blood, liver, spleen, and kidney, but not in the brain or urine. Specific changes were not observed in any organs other than the lungs. Hamsters, g. pigs, rats, and hedgehogs could be infected, but not rabbits, cats or canaries; the virus was passaged on fowl chorio-allantoic membrane.

Even one or more attacks of the disease did not produce immunity, neither did intravenous, subcutaneous, intraperitoneal, intracerebral, or oral administration of virus. Neutralizing antibodies could not be produced in mice or g. pigs. [In this respect the condition is similar to that described by FREEMAN—see preceding abst.]—JOHN FRANCIS.

NEITZ, W. O., & ALEXANDER, R. A. (1941). **The Immunization of Calves against Heartwater.**—*J. S. Afr. vet. med. Ass.* **12.** 103–111.

As a result of the observation that, under laboratory experimental conditions, calves up to the age of four weeks and lambs up to seven days possess a marked degree of immunity to heartwater, field experiments were carried out under ranching conditions. Inoculation with virulent blood resulted directly in a 2·5% mortality from heartwater in young calves. On subsequent exposure to natural infection a further 5·5% died from heartwater. In later experiments the initial direct loss following inoculation was brought down to less than 1% by the use of uleron and by the control of intercurrent infections. The method was not considered to be a practical one for use on a large scale under field conditions at present, owing to the difficulty in ensuring that viable rickettsia are inoculated into the calves, but valuable data on immunity and immunity production have been obtained.—E. M. ROBINSON.

SINGER, E. (1941). **Experiments on the Survival of Rickettsiae in Cell-Free Media.**—*Aust. J. exp. Biol. med. Sci.* **19.** 123–124.

After adaptation to tissue-culture conditions, strains of rickettsia of European typhus and Rocky Mountain spotted fever were inoculated into a mixture of equal parts of g. pig serum, Tyrode's solution and 1% glutathione solution. The rickettsia were detected by g. pig inoculation up to the third to the fifth fortnightly subculture. No propagation was observed when glutathione was omitted or replaced by sodium thioglycollate or several other substances not named. *R. burneti* persisted to the second weekly passage in serum-Tyrode mixtures previously incubated with g. pig spleen for a week; to the third passage in serum-Tyrode, separated by a semipermeable membrane of pore diameter of approximately 1 mμ from other serum-Tyrode containing fresh g. pig spleen; and to the third passage when separated by a semipermeable membrane from serum-Tyrode extract of g. pig spleen, either fresh or after the tissue glutathione had been oxidized by aeration.—A. W. BANKS.

SMITH, D. J. W. (1941). **Studies in the Epidemiology of Q Fever. 8. The Transmission of Q Fever by the Tick** *Rhipicephalus sanguineus.*—*Aust. J. exp. Biol. med. Sci.* **19.** 133–136. [For previous parts, see *V. B.* **12.** 160].

The tick *R. sanguineus*, which occurs in northern Australia upon the dog (its natural host), sheep, cattle, the horse, the cat, and man, all of which are known or potential reservoirs of infection, was shown to be a potential vector of "Q" fever. Larvae, nymphs, and adults were readily infected by being fed on infected g. pigs during the febrile period. The rickettsia were passed from larvae to nymphs, and from nymphs to adults, but not from the latter to their progeny, as shown by examination of smears and sections, and by inoculation and feeding tests.

In infected ticks examined after feeding, rickettsia were seen only in the lumen and lining epithelium of the midgut, and invasion of nuclei was never seen. The minimum infecting dose of tick faeces 65 days after collection was 10^{-8} g. per g. pig.

Infected female ticks yielded about 3 ml. each of rickettsial suspension suitable for agglutination tests.

—A. W. BANKS.

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

RUNNELLS, R. A., & BENBROOK, E. A. (1942). **Epithelial Tumors of Horses.**—*Amer. J. vet. Res.* **3.** 176–179.

An account is given of 73 benign and malignant epithelial tumours submitted for histological examination. Of these, seven were papillomas, 54 were squamous-celled carcinomas, two were adenomas and ten were adenocarcinomas. Thirty-five of the squamous-celled carcinomas originated on the membrana nictitans and varied in age from 2–3 weeks up to six years, metastasis occurring only once. The average age of the affected horses was eight years. The opinion is given that adenomas and adenocarcinomas are relatively rare in horses.—J. C. BUXTON.

I. KENNY, J. E. (1942). **Primary Adeno-Carcinoma of the Udder of a Milch Cow.**—*Vet. Rec.* **54.** 240–241.
II. HARE, T. (1942). **Neoplasia? [Correspondence].**—*Ibid.* 256.

I. K. describes a case of primary adenocarcinoma of the udder in a ten-year-old Shorthorn cow. There were secondary growths in the supramammary lymph nodes, liver, lungs, and possibly in the bronchial and mediastinal lymph nodes and diaphragm. A brief review of the literature indicates that the condition has not previously been described in the bovine udder. There are eight photomicrographs illustrating the primary and secondary tumours.

II. H. does not accept K.'s diagnosis of adenocarcinoma [see I] and suggests that the condition is one of hyperplasia and metaplasia. Owing to the extreme rarity of the condition he suggests confirmation by submitting the sections to a member of the staff working under the Imperial Cancer Research Fund.
—E. G. WHITE.

RENK, W. (1941). Ueber ein phlebogenes angioplastisches Sarkom in der Mündung der Vena cava caudalis einer Kuh. [**A Phlebogenous Angioplastic Sarcoma in the Mouth of the Caudal Vena Cava of a Cow**].—*Arch. wiss. prakt. Tierheilk.* **76.** 425–435.

R. describes in detail an angiosarcoma arising from the wall of the posterior vena cava of a cow near its entry into the right auricle. A review of the literature shows this to be the first record of an angiosarcoma in this site. The tumour extended along the vena cava and formed a large mass within the right auricle as well as extending through the wall of the vein to infiltrate the perivascular connective tissues. The tumour arose from the vessel wall, including the vasa vasorum, and consisted mainly of spaces lined by cuboidal or columnar cells and filled with blood. In some areas the tumour tissue was composed of undifferentiated cell columns without central canalization.—E. G. WHITE.

GREENE, H. S. N. (1941). **Heterologous Transplantation of Mammalian Tumors. I & II. The Transfer of Rabbit Tumors to Alien Species.**—*J. exp. Med.* **73.** 461–474 and 475–486.

I. Certain rabbit tumours were successfully transplanted to other animal species (g. pigs, swine, goats, and sheep) by inoculation of a small fragment of the tumour into the anterior chamber of the eye. The transplanted tumours obtained a blood supply from the host and invaded the peri-orbital tissues but did not metastasize. In general, the cellular structure of the original rabbit tumours was maintained in the foreign host, but there were variations in the relation of parenchyma to stroma.

It was also found possible to transplant rabbit endometrium and mammary tissue into the eyes of g. pigs, the transplanted tissue surviving for about 20 days. Transplantation of rabbit embryonic tissue was also successful, but survival was limited to skin and cartilage.

II. The successful transplantation of several human malignant tumours into the anterior chamber of the eye of g. pigs and rabbits is described; in one instance the transplanted tumour was maintained by serial transfer. The tumours included mammary carcinoma, carcinoma of the colon, melanotic sarcoma, and fibrosarcoma. Whereas transplants of the sarcomas retained the cellular characters of the primary tumours, the transplanted fragments of the carcinomas showed less organization than the primary growths.—E. G. W.

SWAN, C. (1941). **The Route of Transmission of the Virus of Infectious Myxomatosis of Rabbits to the Central Nervous System.**—*Aust. J. exp. Biol. med. Sci.* **19.** 113–115.

After intradermal or intravenous inoculation, the virus was detected in the bloodstream earlier than in the nervous system, and was distributed irregularly in the latter; the level of the spinal cord corresponding to the site of inoculation was not affected first, and the virus travelled equally readily from a denervated inoculation site. S. concludes that the virus, after peripheral injection, enters the bloodstream and invades the nervous system at random through the walls of the blood vessels.—A. W. BANKS.

HERZBERG, K., & THALEN, A. (1938). Ueber den Nachweis und den Vermehrungsvorgang des Virus des Shopeschen Kaninchenfibroms. [**The Virus of the Shope Rabbit Fibroma**].—*Virchows Arch.* **303.** 81–89.

HERZBERG, K., & WEDEMANN, E. (1940). Die Virusvermehrung beim Kaninchenfibrom von Shope und ihre Bedeutung für die Beurteilung virusbedingter Wucherungen. II. Mitteilung: Der Entzündungsstamm. [**Virus Increase in Rabbit Fibroma and Its Significance in the Estimation of Virus-Caused New Growth. II. The Inflammatory Strain**].—*Zbl. Bakt. I. (Orig.).* **146.** 104–112.

These articles describe in detail with illustrations the histogenesis of lesions caused in the skin of rabbits by intradermal injections of the two varieties of fibroma virus, *viz*, the fibroma and the inflammatory strains respectively.

The main distinctions between the two were that the former strain causes the development of numerous fibroblasts, and of enormous swollen fibroblasts, and the production of a substance which stains blue with Victoria blue. The inflammatory strain does not do this, but merely causes diffuse inflammation of relatively short duration. The originals should be seen for the details.—J. E.

CSONTOS, J., & SÁLYI, G. (1939). A Marek-féle tyúkbénulás. [**Marek's Fowl Paralysis**].—*Állatorv. Lapok.* **62.** 347–349.

No F.P. was diagnosed in Hungary for 32 years after it had been described there for the first time by MAREK, in imported fowls. The authors now describe the occurrence of the disease for the first time since that notable occurrence. One flock was affected. Control seemed to be best achieved by slaughter of all birds on the farm. The authors give a brief review of the literature, and the aetiology, symptoms, and pathological changes of the disease.—J. CSONKA.

IMMUNITY

I. —. (1942). **The Tuberculin Test.**—*Vet. Rec.* **54.** 191–192.
II. —. (1942). **The Comparative Test with Weybridge Tuberculin.**—*Ibid.* 192.

I. An account is given of the introduction of Weybridge heat-concentrated, synthetic medium tuberculin and the initial confusion produced by its high potency in eliciting skin reactions both in infections with bovine type tubercle bacilli and with related acid-fast organisms. This necessitated modification of dosage and the application of a comparative test with avian tuberculin to detect reactions due to infection of avian type, and it stimulated further investigation of the tuberculin test, including the usefulness of purified tuberculin (P.P.D.). Results are interpreted at the central office of the Animal Health Division because

inspectors cannot be supplied with past test history of the herd and because of the necessity for estimating significance in the light of such records; it is considered that uniformity is also ensured by such centralized control. The factors affecting the ordinary and comparative tests are described as well as the procedure after interpretation.

II. This article comprises notes on the comparative test with mammalian and avian tuberculin and on the system of interpretation adopted by the Ministry of Agriculture. Double intradermal injection into the neck is practised; difference in sensitivity of different areas is discussed. Data are given relating to the skin measurements in the tests, and it is stated that any swelling with diffusion should be regarded as a positive reaction. The circumstances indicating the need for the comparative test are described; interpretation varies according to the occurrence of avian type infection and the past history of the herd, if known.—A. B. P.

—. (1939). **Report of the Committee on the Use and Standardization of Tuberculin [Australian Veterinary Association].**—*Aust. vet. J.* **15.** 80–86.

The report discusses types of tuberculin, technique and interpretation of the ophthalmic, subcutaneous and intradermal tests, and desensitization by previous tuberculin tests. It is emphasized that a careful description and physical examination of every animal should be made before the test is commenced. The single intradermal test in the skin of the neck or shoulder, or the caudal fold and vulva, and the double intradermal test in any of the above three sites, were felt to be satisfactory when capably performed. The committee was not prepared to express an opinion on the value of one intradermal test compared with another, or with the subcutaneous test, but it was felt that the single test, using both caudal fold and vulva, could be adopted with confidence. The committee recommends "synthetic" tuberculin as superior to Old Tuberculin for the intradermal test; it should be prepared from a good tuberculinogenic strain of either human or bovine origin. The standardization of the product may be safely left to reputable manufacturers, but it is advisable that it be standardized in cattle as well as in g. pigs when required for the intradermal test. After the adoption of a standard technique, it should be taught to veterinary students during their course, under the supervision of a veterinarian with wide experience in all types of tuberculin testing. Graduates should be given facilities for becoming proficient. Uniform methods of testing, accreditation etc. should be adopted throughout the Commonwealth.—A. W. Banks.

Coviella, J. F., & Loustau, J. A. R. (1942). Valor comparativo prático de algunos procedimientos en el diagnóstico de la tuberculosis en los bovinos. **[Value of Different Diagnostic Tests for Bovine TB.].**—*Rev. Med. vet., B. Aires.* **24.** 35–61.

The authors carried out a variety of tuberculin tests on each of a number of imported bovine animals in quarantine. The animals were subsequently examined P.M. to verify the results. These were as follows:—Vallée's double subcutaneous test, 91·66% accurate; the caudal fold intradermal test, 72·72%; the subcutaneous test, 68·18%; the complement-fixation test, 54·83%; the double intradermal test, 48·57%, and the ophthalmic test, 33·33%.

It is concluded that the most certain way of diagnosing TB. is by the use of more than one method of tuberculin testing.—Miller Watson.

Krupski, A. (1941). Zur Frage der Treffsicherheit der subkutanen Tuberkulinprobe beim Rind. **[Reliability of the Subcutaneous Tuberculin Test].**—*Schweiz. Arch. Tierheilk.* **83.** 287–292.

The author defends the subcutaneous tuberculin test holding that, carefully carried out in conjunction with a through clinical examination, it is as reliable a method of detecting the tuberculous bovine as is the intradermal test. He concedes, however, that the former test is more liable to produce an unpleasant general reaction with consequent aggravation of the disease process, and that, of course, it is much more troublesome to perform.—J. Lochiel McGirr.

*de Blieck, L., & Jansen, J. (1940). Over het tuberculineeren van runderen. **[Comparative Tuberculin Test on Cattle].**—*Tijdschr. Diergeneesk.* **67.** 1011–1024. [Abst. from abst. in *Zbl. Bakt. I. (Ref.).* **140.** 175].

As the result of a review of the literature and their own experience, the authors suggest that the method of choice is, as a rule, the single intradermal test in the caudal fold using a highly potent, purified tuberculin.
—J. Lochiel McGirr.

Schuberth, H. (1940). Untersuchungen über Sauton-Tuberkulin und seine Reinigung. **[Investigations into Sauton Tuberculin and its Purification].**—*Hoppe-Seyl. Z.* **266.** 225–238.

The use of tannic acid and acetone for the preparation of biologically active material from filtrates of *Mycobacterium tuberculosis* (human strain) is described.

The organisms are grown for eight weeks on Sauton medium, passed through a Berkefeld filter without heating, and the filtrate potency assessed by biological tests. By the addition of 1 ml. glacial acetic acid to 100 ml. of this filtrate, high molecular weight protein material is precipitated: this is discarded; 15 ml. of 20% tannic acid solution are now added, and the resultant precipitate is centrifuged off, washed with 1% tannic acid solution, redissolved in dilute ammonia, and precipitated by 20 ml. acetone containing 0·06 ml. conc. HCl. The deposited material is washed with acetone, then with ether, and finally dried in a vacuum desiccator over $CaCl_2$.

This procedure yields 50 mg. of a lightly coloured material per 100 ml. of the culture filtrate. It dissolves in dilute alkali to give a clear solution, has a total N (Kjeldahl) content of about 15·2%, and gives negative carbohydrate tests. The lethal dose for tuberculous g. pigs is 0·16 mg., while the minimal amount required to produce a skin reaction is 0·000125 mg.

The preparation of a carbohydrate fraction with a total N (Kjeldahl) content of 0·73% is also described.

The protein fraction reaches a maximum in the filtrate after 60 days' incubation, while the amount of carbohydrate after 120 days is double that of 60 days.
—J. Lochiel McGirr.

I. Seibert, F. B., & Nelson, J. W. (1942). **Electrophoretic Study of the Blood Protein Response in Tuberculosis.**—*J. biol. Chem.* **143.** 29–38.

II. Seibert, F. B., & Nelson, J. W. (1942). **Electrophoretic Identification of Antibody to Tuberculin Protein.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 77–80.

I. Criteria are given for normal rabbit and human sera which make it possible to determine, by means of the Tiselius electrophoresis technique, whether subjects are normal or not. In the case of TB. there is a progressive decrease in the amount of albumin with progress of the disease. The first change in the globulins is a rise in α-globulin, accompanied by an abnormal "κ component" with an electrophoretic mobility slightly greater than albumin. These changes are regarded as evidence of sensitization to tuberculin protein. The

β-globulin increased in all cases as the disease reached the terminal phase. It is suggested that a rise in γ globulin may accompany resistance to the disease.

Since changes in serum proteins also occur in many other disorders, the diagnostic value of the somewhat laborious technique is not great, and the chief use of the method is for study of the fundamental nature of diseases, and in the search for antibodies.

II. Antibody to tuberculin protein has been identified in serum as a component with an electrophoretic mobility close to α-globulin. This component increases in rabbit sera following sensitization to the antigenic form of the protein and is partly removed with the specific precipitate produced by adding antigen to immune serum.—H. H. GREEN.

McCARTER, J. R., & WATSON, D. W. (1942). **The Relationship of the Antigenicity, Physical-Chemical Properties, and Polysaccharide-Content of Tuberculins to their Intracutaneous Activity.**—*J. Immunol.* **43.** 85–98.

Unless otherwise stated, the various phenomena here described were observed in the highly sensitive human subject.

In general, the more active the tuberculin the earlier the skin reaction appears, while, with an increase in the dose, the speed of the reaction is also increased. Early reactions (read at 6 hours) were indistinguishable from delayed reactions (read at 24 or 48 hours) in any externally evident characteristic, although they were apparently different in form if read at the same time after injection rather than at the same time after the reaction started to appear.

Polysaccharide fractions produce reactions indistinguishable from tuberculin protein reactions, but the amounts of such polysaccharide fractions necessary to elicit reactions are so large that the amounts present in the strongest dose used for testing tuberculin protein could not account for the reactions. Experimental evidence is adduced to show that protein contamination is responsible for the intracutaneous activity of tuberculin polysaccharide.

The more active tuberculins had the power to sensitize human beings, and it appears that positive reactions at retests at the end of six months did not necessarily prove that infection had occurred in the interim. All the tuberculins used induced Arthus reactions in rabbits when injected in 10 mg. amounts at three-day intervals, and it was shown that antigenicity paralleled the capacity for eliciting the skin reaction. The factor in the preparation which appears to be responsible for the degree of antigenicity and of intracutaneous activity of a tuberculin is the kind and extent of heat treatment. The relationship between these two properties is quantitative, and suggests that the same groupings within the protein molecule are responsible for both properties of the protein.

The question of the high proportion of positive reactors which show no evidence of infection, and the related phenomenon of the so-called "no-lesion reactor" in cattle is discussed.

The authors suggest three possibilities :– (1) sensitization to tuberculin by acid-fast bacteria other than mammalian, *e.g.* avian, (2) sensitization by some other protein similar antigenically to the tuberculin protein, and (3) that a tuberculin may, because of its own toxicity, cause an inflammatory reaction in an unsensitized individual.—J. LOCHIEL McGIRR.

*BAIDAKOVA, Z. L. (1940). **[Attempts to Titrate Tuberculin on Guinea Pigs Sensitized to Attenuated, Killed and Virulent Tubercle Bacilli].**—*Probl. Tuberk.* No. 9. pp. 51–54. [In Russian]. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 352].

G. pigs subcutaneously sensitized with killed bacilli were, in general, unsuitable for evaluation of tuberculin preparations, while those intraperitoneally sensitized with killed and attenuated organisms only permitted titration of relatively large tuberculin doses. On the other hand, g. pigs intraperitoneally sensitized with 0·1–0·01 mg. doses of virulent bacilli were capable of marked and constant reactions : sensitization reached a peak some 24 days after inoculation, and generally resulted in the death of the animal 40 days later.

—J. LOCHIEL McGIRR.

SEIBERT, F. B. (1941). **History of the Development of Purified Protein Derivative Tuberculin.**—*Amer. Rev. Tuberc.* **44.** 1–8.

The work described is mainly that carried out by SEIBERT and her collaborators in America, and is essentially concerned with the preparation of P.P.D. material from human strains of *Mycobacterium tuberculosis.*

At the outset the entire research was placed on a sound footing by growth of the bacilli on a synthetic medium (Long's) containing only pure chemicals, *e.g.* asparagine, ammonium citrate, glycerol, and inorganic salts. Shortly after it had become obvious that biological activity is related to the protein material produced in the culture medium, ammonium sulphate and trichloracetic acid precipitated substances were isolated from the raw cultures after filtering off the live organisms. These products were, however, highly antigenic and, therefore, liable to elicit false positive reactions due to sensitization by previous tests.

The next step was the preparation of the material designated P.P.D., *i.e.* purified protein derivative tuberculin. Cultures grown for 6–8 weeks on synthetic medium were sterilized by heat and filtered, the filtrate being then heat concentrated and freed from glycerol and inorganic salts by ultrafiltration : finally the protein material was precipitated by trichloracetic acid, washed free of acid and simultaneously dried by ether, and thereafter placed in a vacuum desiccator over $CaCl_2$. This so-called P.P.D. was stable in its potency for years, and much less antigenic than the early products prepared from raw filtrates.

As the result of various analytical studies a modified procedure has now been adopted involving the use of ammonium sulphate as protein precipitant, the elimination of evaporation on the water-bath, and final drying from the frozen state (lyophile process). By this method an almost colourless powder containing some 6% polysaccharide and 1·2% nucleic acid was obtained. It is stated to be twice as potent as the previous P.P.D., but has proved to be somewhat more antigenic.—J. L. McG.

SOLOMKIN, P. S. (1941). O prizhiznennoĭ serodiagnostike rozhi svineĭ. **[Serological Diagnosis of Swine Erysipelas].**—*Veterinariya, Moscow.* No. 1. pp. 31–39. [French summary].

S. found the agglutination test to be satisfactory for diagnosis during life. He describes the preparation of a suitable antigen and gives details of a rapid slide test and of a tube test in which the mixture is incubated at 37°C. for 30 min. and then centrifuged for 4–5 min. and the results read. Whole blood or serum, with killed antigen, is used. Agglutinins appeared in the blood on the 7th–9th day after the second vaccination and they could still be detected after 1–3 months. After inoculation of therapeutic doses of swine erysipelas antiserum, positive agglutinins appeared on the second day and were demonstrable for about a month. In pigs affected with the acute form of the disease, agglutinins

appeared on the fourth day and in chronic cases they were always present.—A. MOLDAWSKY.

KARNEEVA, V. E. (1941). Znachenie serologicheskikh issledovaniĭ moloka ovets pri diagnostike brutselleza. **[Importance of Serological Milk Tests in the Diagnosis of Brucellosis in Sheep].**—*Veterinariya, Moscow.* No. 3. pp. 16–19. [French summary].

The results of agglutination tests on blood serum, and of aggln. and complement-fixation tests on whole milk and whey were compared in 90 normal and 702 brucella-infected sheep. The aggln. test on milk is a valuable aid to diagnosis, especially in doubtful cases and in animals which have recently aborted. Performed alone, it is more reliable in early infection and less reliable in old cases. The c.-f. test, for which whole milk or whey can be used, detects 8-28% more animals than the aggln. test on milk.—A. MOLDAWSKY.

GOLUBEV, I. E. (1940). Kolebanie agglyutininov v krovi pri brutselleze loshadeĭ. **[Variation in the Agglutinin Content of the Blood in Equine Brucellosis].**—*Sovyet. Vet.* No. 11/12. pp. 20–22.

G. says that there is great variation in the agglutinin titre and that the test is often unreliable in horses. G. did tests on 30 naturally infected horses over a period of 2½ years.—A. MOLDAWSKY.

PIROSKY, I., DE PIROSKY, R., & D'ALESSANDRO, N. V. (1941). El antígeno glúcido-lípido como fijador de complemento. I—En brucella. **[Glyco-Lipoid Antigen as a Complement Fixer. I. Brucella].**—*Rev. Inst. bact., B. Aires.* **10.** 135–143.

The authors prepared a glyco-lipoid antigen from brucella cultures in accordance with the method described by BOIVIN & MESROBEANU [*V. B.* **6.** 441].

In complement-fixation tests this antigen proved effective and specific. It is suggested that this easily prepared antigen should be used for diagnostic purposes. —MILLER WATSON.

DE PIROSKY, R., PIROSKY, I., & DE YALOV, S. (1941). Naturaleza de la reacción de fijación del complemento. I.—Aspectos cuantitativos de su mecanismo. **[Nature of the Complement-Fixation Reaction. I. Quantitative Aspects of its Mechanism].**—*Rev. Inst. bact., B. Aires.* **10.** 242–257.

A general account. No new facts.—M. WATSON.

HERSHEY, A. D. (1941). **A Descriptive Theory of Specific Precipitation. I. The Theory.**—*J. Immunol.* **42.** 455–484.

In an attempt to propound a theory for an ideal system undergoing specific precipitation, general formulae are derived to express a hypothetical initial equilibrium between multivalent antigen and multivalent antibody. These form the basis for a general theory of precipitation, postulating a minimal disturbance of the initial equilibrium during aggregation, and for a restricted theory specifying the direction of disturbances of the initial equilibrium on the assumption that antigen and antibody are indeed multivalent. The restricted theory is then expanded in a preliminary way for the special case of lattice-formation to permit quantitative description of the composition of precipitate, and more fully to embrace flocculation times and the meaning of optimal proportions.—R. O. MUIR.

CASTANEDA, M. R. (1942). **Selective Agglutination. A Possible Substitute for the Absorptive Test in the Classification of Brucella, Salmonella or their Antisera.**—*J. Immunol.* **43.** 203–211.

C. has observed that, under certain conditions, sera of rabbits immunized against *Br. melitensis* or *Br. abortus* agglutinate the homologous organism unusually quickly and even to an unusually higher titre either in the tube or slide tests. If both antigens are stained with different coloured dyes, *e.g.* red and blue, mixed in equal proportions, put up against a suitable dilution of brucella serum on a slide and mixed by rotation, a ring of colour forms at the edge of the mixture, corresponding to the colour of the homologous organism. The best dilution of serum for the purpose is the equivalent of a titre of 1 : 100 by the tube method. Greater concentrations of antibody result in combined colour rings due to simultaneous agglutination of both antigens. Weak sera cause a poor differentiation due to the slowness of the reaction.

Similar results have been obtained with *Salmonella typhi, S. paratyphi A,* and *S. paratyphi B.* The antigens were prepared in the same manner as the brucella antigens, using three different coloured dyes. Full details of the technique are given and the practical applications of the test are discussed.—D. L. HUGHES.

FELIX, A. (1942). **Weil-Felix Reactions [Correspondence].**—*Lancet.* **242.** 335–336.

Criticism is made of an annotation [*Lancet.* **242.** 113.] in which four papers were quoted in support of the suggestion that brucella infections and acute toxoplasmosis were instances of diseases in which paraspecific agglutination may occur with *Proteus OX19,* the strain used as a diagnostic test for the tsutsugamushi type of typhus fever. F. deals with each paper in turn to prove that the suggestion is unwarranted and considers that confirmation of the findings of SAVOOR & LEWTHWAITE, that the sera of rabbits infected with strains of *Spirillum minus* develop agglutinins for the OXK strain of *Proteus,* would present a much more serious complication in the laboratory diagnosis of typhus fever as well as in agglutination or complement-fixation tests with the corresponding rickettsiae.—R. O. MUIR.

URBACH, E., & GOTTLIEB, P. M. (1941). **Allergy and Immunity. An Analysis of their Interdependence.**—*Amer. Rev. Tuberc.* **44.** 298–309.

The authors stress the importance of distinction between allergy and immunity. After defining these two terms, and anaphylaxis, they review the literature on their relationships. The two interpretations of allergy, namely, that of RICH (the acquired hypersensitiveness of the skin) and that of PIRQUET (the altered reactivity of the organism) are quoted. The authors hold the latter view. They believe that immunity, experimental anaphylaxis, and clinical hypersensitiveness are merely special types of allergy. Though the allergic reaction in infectious diseases is no index or measure of immunity, the authors argue that this must precede reinfection immunity.

The paper provides good references on the subject. —C. P. CHAUDHRI.

LURIE, M. B. (1942). **Studies on the Mechanism of Immunity in Tuberculosis. The Fate of Tubercle Bacilli Ingested by Mononuclear Phagocytes Derived from Normal and Immunized Animals.**—*J. exp. Med.* **75.** 247–267.

The technique is described of the introduction, into the anterior chamber of the eyes of normal, non-tuberculous albino rabbits under novocaine local anaesthesia, of lymph node or bone marrow suspensions from normal and immunized rabbits two days after the subcutaneous or intraperitoneal injection of human or bovine type tubercle bacilli in saline suspensions mixed with India ink. Details are given of the results of microscopic, histological and cultural examination of the aqueous humour and associated tissues, made to determine the fate of tubercle bacilli ingested *in vivo* and *in vitro* within phagocytic cells of the normal and immunized rabbits in the presence of normal or immune

serum. From these results, L. concludes that the increased bacteriostatic properties for the tubercle bacillus conferred on mononuclear phagocytes by active TB. were independent of the immune body fluids and of the tissue environment in which they grew. His quantitative results have been confirmed by the qualitative tissue-culture studies of KALLÓS.—R. O. M.

CORPER, H. J., & COHN, M. L. (1942). **Two Separate Specific Immune Phenomena in Tuberculosis. A Concrete Demonstration.**—*Amer. Rev. Tuberc.* **45.** 200–211. [Spanish summary].

One of the problems in connexion with the treatment of TB. by means of tuberculin therapy is the determination of the proper dose to avoid detrimental allergic intoxication. In order to obtain information on this point, groups of g. pigs were injected with an avirulent human strain of *Mycobacterium tuberculosis* and were divided into two groups, one of which was desensitized with repeated doses of tuberculin or tuberculoprotein. When tested by the intravenous inoculation of a fairly massive dose of virulent tubercle bacilli, the undesensitized animals succumbed as quickly as unvaccinated controls, whereas there was a significant prolongation of life in the desensitized group. These differences still existed, but were not as apparent, when a smaller test dose was used.

The suggestion is made that, provided serious tuberculo-allergic intoxication does not arise, immune g. pigs are more resistant to an intravenous inoculation of virulent bacilli regardless of the amount of the test dose.—R. E. GLOVER.

HARTLEY, G., Jr., & LUSHBAUGH, C. C. (1942). **Experimental Allergic Focal Necrosis of the Liver.**—*Amer. J. Path.* **18.** 323–331.

Focal areas of coagulative necrosis were produced in the liver of rabbits and g. pigs by inoculation with crystalline egg albumen after previous sensitization with the same protein. Thrombosis of branches of the portal vein was rare in comparison with the number and extent of the necrotic foci and is considered secondary to the massive necrosis of liver cells. Congestion of portal veins and sinusoids accompanied the necrotic changes but did not precede them. It is concluded that the focal necrosis was due to union of antigen and antibody and that the other changes were secondary.

These experiments are of special interest in view of the common occurrence of focal necrosis of the liver in various infections and intoxications and of the lack of knowledge of its nature and aetiology.—E. G. WHITE.

PARTRIDGE, S. M., & MORGAN, W. T. J. (1942). **Artificial Antigens with Agar, Gum Acacia and Cherry Gum Specificity.**—*Brit. J. exp. Path.* **23.** 84–94.

Antigenic complexes were prepared from commercial non-antigenic polysaccharides, agar, kanten (partially degraded agar), gum acacia and cherry gum, purified by a simple procedure, and the conjugated protein component of the specific somatic antigens of *Salmonella typhi* and *Bacterium shigae*. The sera of rabbits immunized with these artificial antigens were shown to contain precipitins specific for the polysaccharide compounds of the antigenic complexes. Cross-precipitation tests with agar, gum acacia, and cherry gum antisera and preparations of kanten and various heterologous polysaccharides, demonstrated, with one exception, the specificity of the precipitins. Successful results were obtained from complement-fixation tests with gum acacia and its homologous antiserum, but cross-reactions were not made owing to the unsatisfactory results obtained with kanten-anti-agar and cherry gum anti-cherry gum c.-f. tests. Anaphylactic shock was produced in groups of g. pigs passively immunized with agar, gum acacia, and cherry gum rabbit antiserum by intravenous injection of the homologous hapten. Homologous gum-anti-gum precipitation was not inhibited by glucuronic or galacturonic acid and virulent type II and type III pneumococci were not agglutinated by the gum antisera.—R. O. M.

DRAGSTEDT, C. A. (1941). **Anaphylaxis.**—*Physiol. Rev.* **21.** 563–587.

The work of a large number of investigators is reviewed and the evidence is considered conclusive that a tissue liberation of histamine, heparin, and possibly of choline occurs during the anaphylactic reaction in various animals. The reactions occurring during anaphylaxis in the dog, g. pig and rabbit are discussed in detail. The liberation of histamine can account for practically all the effects other than the incoagulability of the blood, which in the dog can be completely accounted for by the liberation of heparin, and there is no reason to doubt that this may occur in other animals. There is evidence to suggest that choline also may participate in the reaction in the g. pig and possibly in other animals as well. Anaphylaxis in other animals such as cats, rats, horses, and cattle has not been studied very extensively, but in general the symptoms which occur in the last two species are similar to the reported effects of histamine in these animals. A fall in the blood histamine of both the horse and the calf has been reported during anaphylactic shock but as a leucopenia also occurs, and results indicate that 65–85% of the blood histamine is contained in the leucocytes, it seems logical to conclude that the decrease in blood histamine is associated with the leucopenia as it is in rabbits.

The main symptoms of anaphylaxis can therefore be explained as being due to an auto-intoxication by physiologically active substances normally present in various tissue cells and liberated from them by some change in cellular permeability brought about by the antigen-antibody reaction. The tissues concerned may be either fixed tissues as the liver in the dog and the lung in the g. pig, or the circulating tissue as in the rabbit. —R. ALLCROFT.

HOOKER, S. B., & BOYD, W. C. (1941). **A Test of the Alternation-("Lattice"-) Hypothesis with Divalent and Trivalent Haptens.**—*J. Immunol.* **42.** 419–433.

Experiments designed to test a prediction of the alternation ("lattice", "mutual-multivalence", or "framework") hypothesis, that antibody and divalent hapten should precipitate, yielded unfavourable results. Precipitation tests were carried out with several haptens and varying dilutions of the appropriate antisera. No reaction was observed with divalent hapten, although trivalent hapten caused prompt and copious precipitation. The possibility remained that failure to precipitate was due to the fact that the haptens were not molecularly dispersed.—ISOBEL W. BURTON.

LIU, S., & WU, H. (1942). **Recovery of Antibody from Immune Precipitate of Type B Friedlænder Bacillus.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 381–383.

The specific polysaccharide, prepared from type B Friedländer bacilli by the method of HEIDELBERGER, GOEBEL, & AVERY (1925), was added to antisera obtained from the horse and the rabbit by immunization with heat-killed bacilli, and the specific precipitate produced was washed and suspended in 2 or 3% saline. Equal volumes of the suspension of standard nitrogen content were treated with equal volumes of dilute HCl of different concentrations and estimations were made of the percentage of antibody recovered and of the solubility of the acid precipitates at varying pH's. Comparison of the optimal pH for the recovery of antibodies from type B Friedländer and type I pneumococcus

specific precipitates showed that this depended more on the nature of the specific polysaccharide than on the species of animal producing the antibody.—R. O. MUIR.

PAULING, L., & CAMPBELL, D. H. (1942). **The Production of Antibodies in vitro.**—*Science.* **95.** 440–441.

The authors have succeeded in preparing solutions with many of the properties of specific antisera, by allowing mixtures of protein and antigen to interact *in vitro* for several days at 57°C., and subsequently purifying the resulting antibody solution by dialysation. Bovine γ-globulin was the protein used in most of the experiments, but other serum fractions were used with varying degrees of success. The antigens used were the triphenylmethane dye methyl blue, an azo dye, and pneumococcus polysaccharide type III. Other methods of treatment of the protein-antigen mixtures were tried, but the most satisfactory method was the above mentioned one.—ISOBEL W. BURTON.

ROBERTSON, M., & KEPPIE, J. (1941). **In-vitro Production of Toxin from Strains of *Cl. welchii* recently Isolated from War Wounds and Air Raid Casualties.**—*J. Path. Bact.* **53.** 95–104.

Twenty-six strains of *Clostridium welchii* were investigated with a view to correlating their *in vitro* capacity to produce soluble toxin with their *in vivo* pathogenicity. They were obtained from three clinical groups, *viz*, (1) cases showing some degree of gas gangrene, (2) cases in which *Cl. welchii* might be regarded as causing infection, without there being symptoms of gas gangrene, and (3) cases in which the organism was present, but was not established in the wound.

In the course of the experiments, it was found that strains produced their best toxin at certain pH values, and that in some cases, increase of serum in the medium from 2–5% increased the amount of toxin.

In general, the most regularly toxic strains capable of secreting toxin through a fairly wide pH range were also the most effective in causing gas gangrene. Strains of average toxicity were found in all three clinical groups. All of the strains tested, with the exception of one from a mixed infection in group (2), were of a basic toxicity sufficient to cause gas gangrene if the state of the wound was such as to permit of rapid proliferation, and evolution of toxin.—ISOBEL W. BURTON.

ELIZAROVSKIĬ, G. I. (1941). Opyt prigotovleniya sukhogo stolbnyachnogo anatoksina. [**Preparation of a Dry Tetanus Anatoxin**].—*Veterinariya, Moscow.* No. 3. pp. 72–74. [French summary].

Dry tetanus formol toxoid produced in g. pigs a strong immunity equivalent to that produced by tetanus alum toxoid. Exposure of the dry toxoid for 12 hours at a temperature of –36°C. did not reduce its antigenic properties.—A. MOLDAWSKY.

IRWIN, M. R., & GOLDEN, A. (1942). **Individual Response in Rabbits to Immunization with a Complex Antigen.**—*J. infect. Dis.* **70.** 119–125.

By genetic procedures, the antigenic complex of the red blood corpuscles of the Pearlneck dove was separated into a number of its species-specific constituent parts. These cellular characters were named d-1 to d-11. Antibodies against two of these, nos. 1 and 11, were readily formed in rabbits. Agglutinins against the d-5 substance were produced more slowly. Production of antibodies against the other eight was irregular. Antibody response varied in individual rabbits and was not dependent on the age of the animal.

It was found that antibodies against a particular unit character of the r.b.c. might be present in the serum of some immunized animals, and not in others. If these specific antibodies were found in the serum of an individual during immunization, they might sometimes be absent at the same dilution of serum at a later date. They might or might not be present again after further inoculations.—ISOBEL W. BURTON.

VAN KESTEREN, M., BIBBY, B. G., & BERRY, G. P. (1942). **Studies on the Antibacterial Factors of Human Saliva.**—*J. Bact.* **43.** 573–583.

Tests on 15 species of bacteria by the "well" method indicate that saliva exerts antibacterial effects on a wide variety of organisms.

A high antibacterial effect was often associated with a low ptyalin content and a low antibacterial effect with a low leucocyte count and high values for nitrogen and total organic material. But these correlations were not consistent and were not of statistical significance.

The effects on saliva of heating, ultra-violet radiation, storage, freezing and thawing, filtration, adsorption, and of chemical agents suggest that saliva contains at least two antibacterial principles. One of these resembles lysozyme; the other is apparently distinct from it.—M. H. KYAW.

SINGH, B. (1942). **The Blood Groups of Indian Cattle and Buffaloes.**—*Indian J. vet. Sci.* **12.** 12–23.

This appears to be the first record of attempted blood grouping of Indian cattle. Unlike that of man, the classification of blood groups in cattle is complicated by the instability of iso-agglutinins. Although corpuscles keep well for a period of 21–28 days, serum deteriorates rapidly within 24–48 hours, even when kept on ice, thus precluding the use of stock sera of known properties. The present work has, therefore, been based on the use of fresh sera. Serum deteriorated by storage or heat can sometimes be reactivated by the addition of fresh cattle or g. pig serum, but the reactivating agent appears to differ from complement.

Slide or plate methods do not usually yield results owing to the weak agglutination titres of cattle sera. The tube method was therefore used, a few drops of serum usually at a dilution of not more than 1 : 2 being mixed in small tubes with an equal quantity of 2% of corpuscle suspension. The mixture was kept at 37°C. for an hour or so, positive iso-agglutination being usually complete after 20–40 min. In all, 159 cattle and 48 buffaloes were tested, the breeds involved being Hariana, Kumauni, Dhanni, and "plains" buffaloes. A provisional classification similar to that of LITTLE (1929), is proposed:—group I (corresponding to Jansky's O), serum agglutinative, cells not agglutinable; group II (corresponding to Jansky's A & B), serum agglutinative, cells agglutinable; group III (corresponding to Jansky's AB), serum not agglutinative, cells agglutinable, and group IV, serum not agglutinative and cells agglutinable, *i.e.*, without blood-grouping properties.

[According to the International System of nomenclature for blood grouping Jansky's group I = O, II = A, III = B and IV = AB. In the last seven lines, therefore, reference to "Jansky's groups" should read instead "International System groups".]

In the first series of 207 animals examined, the distribution in groups I, II, III, and IV was 12·6, 23·7, 22·2, and 41·5% respectively; in a second series of 132 animals of the Hariana breed the distribution was 12·1, 3·0, 25·8, and 59·1% respectively.

It appears that a large number of cattle and buffaloes possess iso-agglutinins or agglutinable cells or both, but that often only one of the constituents is active. It seems that, unless and until stock sera and corpuscles representing the blood groups are made available, any attempt to introduce a definite classification of blood groups in Indian cattle must be tentative.

—N. S. SANKARNARAIN.

WRIGHT, G. G., Jr. (1942). **The Antigenic Relationship between Horse Antibodies and the Proteins of Normal Horse Serum.**—*J. infect. Dis.* **70.** 103–111.

These experiments were undertaken in an attempt to determine the conditions for the precipitation of antibody by precipitating sera, and to study the general problem of the antigenic specificity of antibody. It was found that horse normal γ-globulin had the same antigenic nature as horse antibody protein. When rabbits were injected with normal horse serum, antibodies of several specificities were developed, but only those reactive with the γ-globulin fraction of the serum were active in precipitating antibodies. Optimum precipitation depended on the ratio between antibody and serum.

If antibodies against γ-globulin were present in a rabbit anti-horse serum, showing multiple zones of flocculation with horse serum, the horse antibody was precipitated only in the zone due to γ-globulin and its antibody. If the concentrations of the antigenic proteins in the rabbit serum were such that the slowly flocculating γ-globulin zone was obscured by the more rapidly flocculating zones of the other serum components, no antibody-precipitating zone was found, even if the rabbit serum contained antibodies to γ-globulin.—ISOBEL W. BURTON.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

SALT, G. (1941). **The Effects of Hosts upon their Insect Parasites.**—*Biol. Rev.* **16.** 239–264. [Author's summary copied *verbatim*].

1. The size of many insect parasitoids is influenced by the size of the different species and individuals of hosts on which they develop.

2. Through its effect on gross size, the host may influence the size and proportion of parts, the presence or absence of wings, the developmental period, the fecundity, the vigour, and the behaviour of its insect parasite.

3. One case is known in which the fundamental dimorphism of an insect parasite is controlled by the species of host on which it develops.

4. The rate of development of many insect parasites is influenced by the host. In the most striking cases, the transfer of a state of diapause from the host to the parasite is involved, and the host may determine how many generations the parasite shall have in a year.

5. Different species of hosts may cause individuals of a parasitic species to behave differently. The behaviour of the larval parasite may be affected, or that of the emerging adult, or that of the adult parasite seeking hosts for its own offspring.

6. In view of these various effects of the host on the morphology, physiology, and behaviour of its parasite, it is necessary to control and standardize the hosts used for any precise work in insect parasitology.

I. RICHES, J. H. (1941). **The Relation of Tail Length to the Incidence of Blowfly Strike of the Breech of Merino Sheep.**—*J. Coun. sci. industr. Res. Aust.* **14.** 88–93.

II. RICHES, J. H. (1942). **Further Observations on the Relation of Tail Length to the Incidence of Blowfly Strike of the Breech of Merino Sheep.**—*Ibid.* **15.** 3–9.

I. The tails of ewe lambs were docked as follows :– long tails to about 4 in., medium tails at about the second tail joint, and short tails on a level with the buttocks. During the first six months after docking the incidence of fly strike, as strikes per 100 sheep, was :– long tails 32·2, medium tails 55·9, and short tails 61·0. In a second experiment a group with undocked tails was included. The strike incidence per 100 sheep was :– undocked tails 12·1, long tails 8·4, medium tails 28·0, and short tails 35·6. Longer tails tend to press apart the wool on the inner breech folds, thus giving a wider opening and better clearance for urination. Longer docking is a valuable means of reducing the incidence of breech strike.

II. Three field trials showed conclusively that the longer or 4-in. tail definitely reduces susceptibility to fly strike of the breech area. The effect is permanent and consistent results were obtained over a period of three years in one trial. The natural, undocked tail reduces the incidence of pure breech strike to approximately the same extent as does the 4-in. tail, but is itself more frequently struck and is objectionable for other reasons. There was no evidence that the longer tail reduced lambing percentages in the experimental groups.—H. McL. GORDON.

GRAHAM, N. P. H., & TAYLOR, K. L. (1941). **Studies on Some Ectoparasites of Sheep and Their Control. 1. Observations on the Bionomics of the Sheep Ked** (*Melophagus ovinus*).—*Pamphl. Coun. sci. industr. Res. Aust.* No. 108. pp. 9–26.

After deposition, pupae take an average of 22 days to hatch. Adult females reach sexual maturity when 5–6 days old, the males when 10–11 days old. The gestation period is about seven days, so that if young males and females are mated, the first pupae are not produced for at least 18 days. Male keds live for about 80 days, and females for about 100 days on the sheep, but will not survive more than about five days off the sheep. Pupae are attached to the wool fibre some distance from the skin, the distance tending to increase with the length of the wool. There are indications of a seasonal decline in the ked population during the warmer months. The susceptibility of different sheep to infestation with keds varies considerably, and observations suggest that younger sheep and those in poor condition, due to malnutrition and/or the effects of internal parasites, are more susceptible.

Experimental procedures are described, and there are observations on the number of pupae per female, the sex ratio, and the habits of keds.—H. McL. GORDON.

*BONELLI, G. (1940). Infestazione da Tunga penetrans nei suini nel Sidamo. [**Infestation of Swine in Sidamo by** *T. penetrans*].—*Riv. Biol. colon.* **3.** 219–222. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 125].

T. penetrans, the chigger, introduced into Africa from America in 1872, infests a large number of pigs in the Sidamo province of Abyssinia. Fertilized females burrow under the skin of the external genitalia, the thorax, and the mammary region, and give rise to inflammatory nodules. There is intense pruritus. Secondary invasion of the wounds by bacteria is common, and also by *Sarcophaga* larvae. The lesions may develop into extensive areas of necrosis and ulceration. Once the *T. penetrans* females have reached a certain size they can be extracted from the lesions by hand.

Under careful antiseptic treatment recovery can subsequently be expected in 6–10 days.—M. LANDAU.

*RAHLMANN, W. (1941). Die geographische Verbreitung der Räude der Einhufer in Europa. [**Geographical Incidence of Equine Mange in Europe**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 212].

It is stated that newly compiled statistics, the nature and source of which are not disclosed, show that the extreme north is completely free from equine mange, and also that it is rarely encountered in Turkey and Bulgaria. Eastern and Central Europe are heavily nfected ; Western Europe, with the exception of Great Britain, but including Italy and Switzerland, is only slightly infected ; mange is rare in Greece.—E. R. P.

CARTER, H. B. (1941). **A Skin Disease of Sheep Due to an Ecto-Parasitic Mite,** *Psorergates ovis* **Womersley 1941.**—*Aust. vet. J.* **17.** 193–201.

A chronic skin disease due to an acarine mite, *P. ovis*, is described. Lesions include hyperkeratosis with production of large amounts of dry, crumbling scurf. A chronic irritation is present and the fleece is damaged, the staple becoming stringy and having a dry, spiral-pointed tip, the tensile strength often being reduced. In advanced cases matting is seen. Patches of wool may be lost. There are very good illustrations of the mites, the microscopic lesions, and the general appearance of affected sheep.—H. McL. GORDON.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

ROBERTS, F. H. S. (1942). **The Host Specificity of Sheep and Cattle Helminths, with Particular Reference to the Use of Cattle in Cleansing Sheep Pastures.** —*Aust. vet. J.* **18.** 19–27.

Five worm-free calves were placed on a pasture on which lambs had previously grazed. Seven of the 14 species of helminths which had infested the lambs were transferred to the calves, *viz*, *Haemonchus contortus*, *Trichostrongylus colubriformis*, *T. axei*, *Strongyloides papillosus*, *Cooperia curticei*, *Trichuris parvispiculum*, and *Moniezia expansa*. The species which did not appear in the calves were *Ostertagia circumcincta*, *O. trifurcata*, *Trichostrongylus vitrinus*, *T. rugatus*, *Bunostomum phlebotomum*, *Oesophagostomum columbianum*, and *Dictyocaulus filaria*. All the calves showed a resistance to infestation by *H. contortus* from sheep, only moderate infestations being set up, and these being rapidly eliminated. Attempts at reinfestation with larvae from sheep, even after single passage through cattle, resulted at most in the establishment of only very small numbers of worms which could not maintain themselves. Calves which proved insusceptible to larvae from sheep were readily infested with larvae of a pure cattle strain. *T. colubriformis* established itself in fairly large numbers but infestations did not persist.

From the point of view of using cattle to control helminths in Queensland, *H. contortus* and *T. colubriformis* are the principal considerations. Cattle could be used to cleanse sheep pastures of *T. colubriformis*, provided that the animals were allowed to remain on the pasture for some months. In the case of *H. contortus*, however, such a procedure would be dangerous because (a) low grade infestations may be set up, particularly in young cattle exposed to *H. contortus* from sheep, (b) sheep are readily susceptible to larvae from sheep, after passage through cattle, and (c) sheep are easily infested with larvae of a pure cattle strain.—H. McL. GORDON.

VAIDYANATHAN, S. N. (1941). **Experimental Infestation with** *Fischoederius elongatus* **in a Calf at Madras.** —*Indian J. vet. Sci.* **11.** 243.

A calf was fed with *Cercaria indicae* XXIX Sewell, 1922, encysted on grass after being obtained from the snail, *Limnaea luteola*. Nine weeks later, 36% of the cercariae were recovered as adult *F. elongatus*.
—G. D. BHALERAO.

I. BUGGE, G. (1942). Das sogen. Muskeldistomum, Agamodistomum suis, ein Bewohner der Bauchhöhle des Schweines. [**The So-Called Muscle Fluke, an Inhabitant of the Abdominal Cavity of Swine**].—*Tierärztl. Rdsch.* **48.** 146–151.

II. BAARS, G. (1942). Distomeen (Agamodistomum suis) in der Muskulatur des Schweines. [*Agamodistomum suis* **in the Musculature of Swine**].—*Ibid.* 255–257.

I. *A. suis* has been described by DUNCKERS, LEUCKART and others as a fluke encysted in musculature and connective tissue of the diaphragm, abdominal muscles, larynx, trachea, etc. of wild and domestic swine. It could occasionally be seen when slips of muscle were examined for evidence of trichinosis. HEMMERT & BUGGE (1934) suggested that these cysts were only apparent, the flukes observed being actually on the surface of the muscle. Subsequent work by B. has confirmed this suggestion. These flukes have many times been observed in wet preparations, lying pressed between muscle fibres or in the surrounding fluid. In such cases where single or very small numbers of the flukes were seen in muscle preparations, examination of peritoneal washings showed hundreds of the parasites. Where large numbers were present there was often slight peritonitis and it is suggested that on slaughter of the host the flukes escape with the peritoneal fluid which runs down over the diaphragm, and occasional flukes may then be seen in muscle preparations from this and other organs. A description of the parasite is included.

II. A wild pig, examined for evidence of trichinosis, was found to be heavily infested with the muscle fluke, *A. suis*. The parasites answered to the original descriptions of Dunckers and were found in the muscle and connective tissue of the diaphragm, intercostal muscles, and larynx ; the infestation in the larynx was particularly heavy ; as many as four flukes were seen in single fields in wet preparations. The parasites were actively motile and in no case was a capsule observed. Paraffin sections showed that the flukes were lying in spaces in the muscle, more or less sharply circumscribed by a narrow zone of cell infiltration and connective tissue. Some spaces were empty and it is suggested that the flukes lie in tunnels which they have bored in the muscle, and that the parasite is an active one and does not normally become encapsulated. The peritoneal fluid was not examined. Baars contends that his definite findings in paraffin sections establish *A. suis* as a genuine muscle parasite and refute the contentions of BUGGE [see I].—H. E. HARBOUR.

BASHKIROVA, E. Y. (1941). Izuchenie biologii Anoplocephala perfoliata Goeze, 1782. [**Biology of** *A. perfoliata*].—*Veterinariya, Moscow.* No. 2. pp. 57–67. [French summary].

The intermediate hosts of the horse cestode, *A. perfoliata*, are mites, such as *Scheloribates laevigatus*, which are also the intermediate hosts of *A. magna* and *Paranoplocephala mamillana*. At temperatures of 18°–20°C., the cestode larvae develop to the stage of mature cysticercoids in the mite in 145–150 days. The time of development depends not only on the temperature but also on the season at which infection of the mite takes place. At 26°–27°C. in late August, for instance,

the young cysticercoids form after only 53 days. Contrary to previous statements, mites could be infected with cestode eggs from freshly deposited horse faeces; this proves that eggs do not necessarily undergo any development outside the host. B. describes technical details of his experiments and suggests that the best time for collecting mites for investigation is in the early spring and during the autumn, when the ground is wet. They are best kept in a humid atmosphere at 14°–20°C.
—E. R. PARISER.

SCHOOP, G. (1942). Cysticercus tenuicollis bei Rehen. [*C. tenuicollis* **in Roe Deer**].—*Dtsch. tierärztl. Wschr.* **50.** 226–227.

C. tenuicollis infestation in roe deer is described. It was demonstrated that the fox acts as an occasional host for the adult form, *Taenia hydatigena*, the principal host being the dog.—E. R. PARISER.

GRUBER, G. B. (1939). Zur Frage nach der Natur des Echinokokkus. [**The Nature of** *Echinococcus*].—*Dtsch. tierärztl. Wschr.* **47.** 665–669 and 680–683.

This is a detailed review, well illustrated by photographs, of the question of the nature of the different forms of *Echinococcus* infection in man and animals. In particular the work of POSSELT and of DÉVÉ is discussed. The former held the view that *E. alveolaris* and *E. hydatidosus* are distinct varieties, basing this view on the evidence of geographical distribution, pathological picture, and on observed morphological differences in the parasites [see *V. B.* **8.** 294]. Dévé held the opposite view. The question is one of more than academic importance since the prognosis in cases of alveolar echinococcosis is invariably bad, whereas successful extirpation of the hydatid type is often possible.

G., while inclining to the view of Dévé of the essential identity of the two forms, points out the necessity for experimental research on the parasite in animal hosts coupled with observation of human cases.
—H. E. HARBOUR.

SAWITZ, W. (1942). **The Buoyancy of Certain Nematode Eggs.**—*J. Parasit.* **28.** 95–102.

The distribution was determined of eggs in the surface layer, the upper and lower portions of the supernatant liquid, and in the sediment, after centrifugal flotation in zinc sulphate solutions of known specific gravities. The values determined for the eggs are not necessarily the true specific gravities, as interaction is possible between floating medium and egg.

Eggs of *Trichuris trichiura* and *T. vulpis* were floated up in solutions of sp. gr. 1·150 and higher; a 1·180 solution yielded 85% of the total number of *T. trichiura* and 52% were in the first coverglass preparation. *Ancylostoma caninum* eggs floated at sp. gr. 1·055 and higher; 1·180 solution floated up 100%, and 87% were on the first coverglass.

The values for fertilized *Ascaris lumbricoides* eggs varied from 1·110 to 1·130; a 1·180 solution yielded up 97–100%, and 57–79% were on the first coverglass. Only 39% of unfertilized *A. lumbricoides* eggs were floated up at sp. gr. 1·200, while 99% were buoyed up in a 1·250 solution.—M. L. BINGHAM.

VAIDYANATHAN, S. N. (1942). **A Preliminary Note on the Incidence of** *Strongyloides papillosus* **Wedl, 1856 in India.**—*Indian J. vet. Sci.* **12.** 37–44.

The author detected *S. papillosus* infection in bovines and ovines in Madras. Rhabditiform and filariform (infective) larvae were obtained from cultures of infected faeces. Parasitic females were recovered at autopsy. Descriptions are given of the adult female and the larval forms. No males were detected. It is observed that full-grown cattle acquire immunity to this infection.—G. D. BHALERAO.

BOROVKOVA, A. M. (1941). K izucheniyu tsikla razvitiya vozbuditelya tominksoza dykhatel'nykh puteĭ cerebristo-chernykh lisits. [**Life-Cycle of** *Capillaria aerophila*, **a Lungworm of Silver Foxes**].—*Veterinariya, Moscow.* No. 2. pp. 68–74. [French summary].

B. discusses the literature and asserts that CHRISTENSON's work in 1938 on the life-cycle of *C. aerophila* was inaccurate. Whereas CHRISTENSON had stated that the life-cycle was completed without any intermediate host it was, in fact, discovered that earthworms (*Lumbricus rubellus*, *L. terrestris*, and *Allolobophora caliginosa*) act as intermediate hosts. Development of the parasite to the fully mature stage in the dog, fox, and cat takes 25–29 days.—E. R. PARISER.

I. SCHOOP, G., & SCHADE, M. (1939). Der Fuchs als Verbreiter der Trichinosis. [**The Fox as a Spreader of Trichinosis**].—*Dtsch. tierärztl. Wschr.* **47.** 553–561.

II. LEINEMANN. (1941). Fuchstrichinose. [**Trichinosis in Foxes**].—*Tierärztl. Rdsch.* **47.** 398.

I. The authors examined the carcasses of 275 red foxes in the district of Kurhessen in Germany and found 12 (4·4%) trichinosed.

In the fox the cysts are round to round-oval in form. The form appears to vary with the host and the fox trichina cannot be regarded as a distinct species. The parasite could be transmitted to small laboratory animals and to swine. An examination of 796 field mice did not reveal trichinosis. The authors considered that the most frequent mode of transmission was from fox to fox. Huntsmen put skinned carcasses out so that wild animals can eat them; carcasses are also frequently thrown on manure heaps where they may be accessible to domestic swine. Trichinosis also occurs in silver foxes which become infected from the flesh of wild foxes and from rats.

The incidence of trichinosis in domestic swine in Germany had fallen from 0·61 per thousand in 1878 to 0·02 per thousand in 1913. Since then, apart from a slight increase in the war years of 1914–18, the figure had remained low. The significance of the comparatively high incidence in foxes is discussed and it is estimated that more than 9,500 trichinosed foxes might be killed annually in Germany. The authors considered that fox trichinosis is the most widespread form of the disease in Germany, that it represents a menace to public health, and that cases in domestic swine must largely arise from the ingestion of infected fox flesh. A campaign against fox trichinosis by ensuring the proper disposal of carcasses is therefore desirable.

II. Following the work of STROH, VON OSTERTAG, and others, showing a high incidence of trichinosis in foxes, L. examined the flesh of 179 foxes at Frankfurt a.O. In no case were trichinae found, and L. concludes that this particular district is free from fox trichinosis.
—H. E. HARBOUR.

*SCHULZE, H. (1941). Ueber das Vorkommen der Fuchstrichinose in den Kreisen Peine und Clausthal-Zellerfeld. [**Trichinosis of Foxes in the Peine and Clausthal-Zellerfeld Districts**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 419].

S. examined 48 foxes from Peine and 139 from Clausthal-Zellerfeld and found trichinae only in two from the latter area. Trichinosis in swine has been unknown in Peine for 40 years, but a few cases have been seen in the other district, in which it is possible that foxes and swine are connected epidemiologically.

*AASER, C. S. (1941). **[Trichinosis in Fur Animals].**—*Norsk VetTidsskr.* **53.** 198–226. [Abst. from abst. in *Tierärztl. Rdsch.* **47.** 583].

Trichinosis was first detected in Norway in imported pork in 1864. Trichinosis in man was observed in 1881–82, while the detection of trichinae in a rat in Oslo in 1914 led to obligatory examination in Norway of all pork products. In 1940 an epidemic of trichinosis following the eating of sausage occurred amongst soldiers of the German army of occupation: 680 soldiers and ten civilians were affected. Following this epidemic, stricter control was introduced and examination was made of fur-bearing and other animals and of human cadavers in which death had occurred from other causes. The following incidences were recorded :– 218 out of 2,063 mink, 1,395 out of 18,567 captive foxes, 18 out of 92 wild foxes, 7 out of 39 rats, 2 out of 11 cats, none out of 52 dogs, 4 out of 40 swine, and 1 out of 286 human beings. The general health of infected fur-bearing animals was not markedly affected. Occasional animals lost condition while some young animals showed diarrhoea and some stiffness of the hind limbs; the disease in these cases was fatal.—H. E. H.

*PAVLOV, P. (1940). Ricerche sperimentali sulla trichinellosi dei volatili. **[Trichinosis in Birds].**—*Riv. Parassit.* **4.** 175–187. [Abst. from abst. in *Zbl. Bakt. I. (Ref.).* **140.** 227].

P. showed that, in contrast to some previous findings, pigeons can be made susceptible to experimental trichinosis by being kept on a special diet of boiled oats for 39 days. The pigeons were fasted for 48 hours before and after artificial infection, which was carried out by feeding with muscle of infected mice. After infection, the oat diet was continued. Trichinae capable of infecting mice appeared in some pigeons approximately 35 days after infection, but in some birds the worms were found to be dead. [See also MATOFF—*V. B.* **11.** 528.]

No trichinae were found after 42 days in a 12-day-old sparrow-hawk fed on infected muscle.—E. R. P.

OFFUTT, E. P., Jr., & MCCOY, O. R. (1941). **The "Gopher", *Citellus richardsonii* (Sabine), as an Experimental Host for *Trichinella spiralis*.**—*J. Parasit.* **27.** 535–538.

Trichinella spiralis is able (experimentally) to develop in all species of mammals that have been tested and even in certain birds. Degrees of susceptibility exist, *e.g.* rats, which are well known vectors, are relatively insusceptible and readily develop a high degree of resistance to reinfection, whereas g. pigs and monkeys are relatively susceptible, are killed by comparatively small doses of larvae, and develop only slight resistance to reinfection. *C. richardsonii*, a ground squirrel or "gopher", is a small rodent widely distributed in the North Central U.S.A. and adjacent parts of Canada. It has never been reported as a natural host of *T. spiralis*. The authors experimentally infected 23 ground squirrels with doses of 2–40 trichina larvae per g. body weight. Ten of 14 animals died following infection with doses as small as 2–5 larvae per g. body weight. Adult worms persisted in the intestines for longer periods than had been noted for other hosts, the maximum period observed being 13 weeks. The experiment showed that the ground squirrel is very susceptible to infection. Five ground squirrels that were reinfected showed no resistance to the fairly small test doses of larvae which were used.—H. E. HARBOUR.

WARREN, M., DRAKE, E. H., & HAWKES, R. S. (1940). **Some Observations on the Persistence of the Bachman Skin Test and of Eosinophilia after Recovery from Trichinosis.**—*Ann. intern. Med.* **13.** 2141-2146.

A positive reaction to the Bachman skin test was given by 85% of patients who were retested three years after recovery from clinical trichinosis, although there was a tendency for the reaction to be less striking. All the patients had a positive skin reaction and eosinophilia during the initial attack. Another group which had shown no symptoms but had both eosinophilia and a positive skin reaction were retested and 75% still reacted after three years. Those with subclinical trichinosis and a negative skin test were still negative at the retest. The results of leucocyte counts were not conclusive, but it appears that eosinophilia is rarely present three years after infection.—M. L. BINGHAM.

WELT, L. G. (1941). **Urinary Excretion of Trichina Antigen in Experimental Trichinosis.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 587–589.

Two monkeys were fed *Trichinella spiralis* larvae, and observations were made during the following 10 and 12 weeks respectively. Trichina antigen was demonstrable by precipitin test in the urine and blood serum for several weeks during early and late stages of the infestation. At the same time, trichina antibody was demonstrable in the serum.—M. L. BINGHAM.

MCNAUGHT, J. B., BEARD, R. R., & MYERS, J. D. (1941). **The Diagnosis of Trichinosis by Skin and Precipitin Tests.**—*Amer. J. clin. Path.* **11.** 195–209.

After briefly discussing the various laboratory aids to the diagnosis of trichinosis, the authors describe in detail their methods of preparing antigen and performing the intradermal and precipitin tests in human beings. There are two types of skin reactions. The delayed tuberculin-like reaction occurs early in the infection, and the immediate type of reaction, consisting of a wheal with a zone of erythema, occurs during the second or third weeks. The precipitin test usually becomes positive a few days later. Skin and precipitin reactions may be obtained years after the initial infection. Both tests give a high degree of accuracy and in routine examinations of unselected persons, 24·8% gave either the immediate or delayed type of reaction; precipitin tests were in almost complete agreement with the skin reactions. The authors note that eosinophilia is one of the most useful signs indicating, but not diagnostic of, trichinosis and is valuable in confirming the recent onset of an infection proved by skin and precipitin tests.

—J. N. OLDHAM.

LUCKER, J. T. (1941). **Survival and Development at Low Temperatures of Eggs and Preinfective Larvae of Horse Strongyles.**—*J. agric. Res.* **63.** 193–218.

Experiments were carried out in order to test the findings of BAKER *et al.* [*V. B.* **11.** 170.], BRITTON [*V. B.* **9.** 165.], PARNELL [*V. B.* **5.** 821 and *Sci. Agric.* **16.** 391.] and others, that prolonged freezing or alternate freezing and thawing exert a lethal action on eggs and larvae of horse strongyles. The effects were determined of continuous freezing and alternate freezing and thawing in the laboratory and of natural fluctuations in temperature in winter and early spring outdoors at the federal research centre, Beltsville, on eggs and larvae of species of *Strongylus* and of the sub-family Cyathostominae in horse faeces. Other possible lethal factors, such as drying, excess moisture, and direct sunlight, were eliminated as far as possible.

Continuous exposure to subfreezing temperatures of 14°–21°F. killed 94–100% of unembryonated eggs in faeces in 47–56 days. The percentage of eggs surviving comparable exposures varied, but appeared to decrease gradually as the duration of exposure increased. Embryonated eggs were much more readily killed over the same range of temperatures (7°–32°F.). Repeated exposure of unembryonated eggs to a mean temperature

of 14°F., alternated with thawing for periods sufficient only to allow the faeces to attain normal consistency, was no more lethal than continuous freezing. When the thawings were of sufficient duration to permit appreciable development, the cultures were promptly and almost completely "sterilized". The limit of the ability of eggs to survive at a mean temperature of 36°F. was not determined. In one experiment, 0·5% survived an exposure of 195 days; in two others, about one-half survived 3–4 weeks, but results were variable.

More than 90% of preinfective larvae, principally first and second stage, were killed by 1·2 – 4 days' exposure at 14°–21°F. Older preinfective larvae did not differ markedly. Preinfective larvae at all stages were far more susceptible to freezing than were unembryonated eggs. Larvae that had just reached the infective stage were readily killed by subfreezing temperatures. About 75–95% of preinfective larvae, mainly first and second stage, survived a mean of 36°F. for approximately two weeks; about 25–50% survived for 5–6 weeks, and less than 10% for three months. Those surviving long exposures had very pale intestinal cells, and death was attributed to starvation rather than to direct injurious action of the temperature. In cultures containing chiefly second ecdysis and late second stage larvae, however, the number of infective larvae increased markedly during prolonged exposure at 36°F., and at the end of three months, 40–100% of all the larvae originally present were still alive.

When faeces originally containing unembryonated eggs were exposed outdoors to winter and early spring temperatures in the vicinity of Beltsville, some infective larvae developed during the winter and the cultures were capable of yielding more when returned to the laboratory. In one experiment the total number of larvae developed from exposed cultures represented about one-tenth of those from unexposed controls. Faeces containing preinfective larvae when exposed also developed infective larvae during the winter, and the survivors represented one-fourth to one-twentieth of the potential yield. Eggs embryonated and hatched outdoors in a period when the maximum temperature was 46°F.

During these outdoor experiments, the temperature frequently fluctuated above and below freezing point. Such fluctuations reduced the yield of infective larvae but did not "sterilize" the cultures. It is concluded that the lethal effect of winter exposure depends on the relationships between the variables of temperature and time.—E. S.

BHALERAO, G. D. (1942). **On Some Trichostrongyles of Domestic Ruminants in India.**—*Indian J. vet. Sci.* **12.** 24–29.

The occurrence of *Trichostrongylus extenuatus* and *Ostertagia ostertagi* in Indian goats and cattle, respectively, is recorded for the first time. New hosts are recorded for *T. colubriformis*, *T. probolurus*, *Cooperia pectinata*, *C. punctata*, *Camelostrongylus mentulata* and *Haemonchus longistipes*. Comments are made on the taxonomy of *Ostertagia* (*Marshallagia*) *orientalis*.

—H. D. SRIVASTAVA.

ANDREWS, J. S., & MALDONADO, J. F. (1941). **The Life History of *Oesophagostomum radiatum*, the Common Nodular Worm of Cattle.**—*Res. Bull. P.R. agric. Exp. Sta.* No. 2. pp. 14.

The pre-parasitic stages of *O. radiatum* were found to be similar to those of *Cooperia curticei*, *Trichostrongylus* spp., and of other oesophagostomes. The migratory instinct appeared in the third-stage infective larvae on about the sixth day after passage of the eggs in the faeces. Soon after ingestion by the host, the larvae completed the second ecdysis, passed down the intestine, and entered the wall of the ileum, caecum, or colon within 24–48 hours. The larvae remained in the intestinal wall for about ten days, during which time they grew from 700μ to 2 mm., the cervical glands developed, and the provisional buccal capsule appeared. The genital primordium of the female moved to a posterior position, and after the third ecdysis on the eighth or ninth day, the sexes were easily distinguishable by the blunt tail of the male and the more pointed tail of the female. The fourth-stage larvae returned to the lumen of the intestine where some of them had undergone the fourth ecdysis on the 19th day. They were about 4·5 mm. long. At this time the sexes could be easily differentiated and the adult buccal capsule developed. Eggs were found in the faeces 37–41 days after infection.—M. L. BINGHAM.

*SKVORTSOV, A. A. (1940). **[Developmental Cycle of Lungworms of Pigs in the Intermediate Host].**—*Zool. Zh.* **19.** 751–765. [In Russian: English summary]. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 523].

The eggs of *Metastrongylus apri* are smaller than those of *M. pudendotectus* and they have smoother shells. The shells consist, in both species, of four layers, of which three afford mechanical protection to the embryo, whilst the inner one is in the nature of a semi-permeable membrane. The eggs can withstand temperatures of –20° to –45°C., or 24 hours' drying at room humidity. Hatched larvae may remain alive in damp ground up to three months. Infective-stage larvae from various species of earthworms can be distinguished from younger forms (a) by their size, (b) by the presence of a vagina, (c) by the absence of a knob at the tip of the tail, and (d) by the presence of intestinal cells with conspicuous nuclei.—M. LANDAU.

BHALERAO, G. D. (1941). *Subulura minetti* **n. sp. (Nematoda) from an Indian Fowl.**—*Proc. Indian Acad. Sci.* Sect. B. **14.** 339–340.

A new species of the genus *Subulura* is described from an Indian fowl and is compared with two other species, *S. strongylina* and *S. differens*.—H. D. S.

SECK, P., & SCHUMACHER, W. (1942). Ein Beitrag zur Abtötung von Spulwurmeiern. **[The Killing of Ascaris Eggs].**—*Zbl. Bakt. I.* (*Orig.*). **148.** 314–317.

Experiments were made with the disinfectant eimeran, which is stated to be capable of reaching and dissolving the interior wall or membrana vitellina of ascaris eggs, which consists mainly of fatty substances. The disinfectant contains, besides organic S compounds, the Cl fraction of a coal-tar preparation which passes over between 195° and 205°C. Eggs of *Parascaris equorum* were used for testing the preparation and it was shown that a 5% eimeran solution kills in 2½ min. all eggs which have not yet undergone cleavage. A 5% solution kills also in 2½ min. 48%, in 5 min. 91%, and in 7½ min. 97% of eggs which have developed into the early embryo stages. The eggs of other ascarid species and of mammalian strongyles show a resistance equal to, or lower than, *Parascaris* eggs; it is therefore asserted that a 5% eimeran solution kills the eggs of all these nematodes.—E. R. PARISER.

BALDWIN, E., & KING, H. K. (1942). **Glycogen 8. The Glycogen of *Ascaris lumbricoides* from the Pig.**—*Biochem. J.* **36.** 37–42.

Details are given of the method for extracting the glycogen of *A. lumbricoides*, when yields of 6·8–7·7% were obtained. The product was further purified and its properties described. Various derivatives were prepared by acetylation and methylation and the mixed

glucosides formed on methanolysis were fractionated. No evidence was obtained of any other radicles present in significant amount other than those present in any typical 12-unit glycogen. The probable chain length of the glycogen was 12–13 units. The significance of these observations is discussed in relation to the immunological properties, described by other workers, of certain polysaccharide preparations obtained from this species.
—ALFRED EDEN.

*TÜZDIL, A. N. (1939). [*Gongylonema* **in Slaughter Animals in Turkey**].—Ankara : Yüksek Ziraat Enstitüsü 1939. pp. 112. [German summary]. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 223].

Gongylonema was found in 60% of the sheep and goats and in 96% of the bovines slaughtered at the Ankara abattoir. A species is described from cattle and buffaloes, distinct from *G. pulchrum*.—M. LANDAU.

HILL, W. (1941). Starker Befall von Enten mit Echinuria uncinata (Magenwurmseuche). [**Severe Infestation of Ducks with** *E. uncinata*].—*Tierärztl. Rdsch.* **47.** 211–212.

KAUKER, E. (1941). Enzootien unter Wassergeflügel durch Echinuria uncinata. [**Enzootic Infestation of Water Birds by** *E. uncinata*].—*Dtsch. tierärztl. Wschr.* **49.** 609–612.

These two papers describe the invasion of ducks by the spirurid nematode, *E. uncinata* in Wartheland (Poland) and in a farming area near Stettin. According to HAMANN, the embryos hatch in the stomach of the host, reaching the water with the faeces, and are then swallowed by *Daphnia pulex*, the intermediate host. K. asserts that only embryonated eggs are found in fresh faeces and that the embryos hatch in the water. Symptoms of the disease begin to appear in July, August, and September when young ducks, 6–14 weeks old, are chiefly affected. When the disease is fatal, it lasts for about eight days. There is incoordination of movement and a serous discharge from the eyes and nose, which causes the eyes to become completely closed. Inappetence gradually develops, but the bird drinks great quantities of water; there is diarrhoea and loss of weight. In the later stages extreme muscular weakness supervenes and the neck is laid with the dorsal side on the back.

Sometimes the disease causes 100% mortality. It can appear anywhere where there is only stagnant water at the disposal of the ducks. Deformation of the proventriculus is the main P.M. finding, due to large and numerous diverticula containing a fluid resembling blood. According to K., no treatment has yet been found; prophylactic measures suggested include the recommendation that young ducks should be kept away from stagnant water, at least during the critical months.
—E. R. PARISER.

HSÜ, H. F., & LI, S. Y. (1940). **Studies on the Food and the Digestive System of Certain Parasites. VI. On the Food of Certain Helminths Living in the Digestive Tract of Vertebrates.**—*Chin. med. J.* **57.** 559–567. [In English].

Histological examination of helminths living in different parts of the intestine of various vertebrate hosts showed that they could be divided into four groups with regard to their food :- (1) those living almost entirely on blood elements; (2) those living on inflammatory exudate together with some mucosa cells of the digestive tract; (3) those living on the host's ingesta in the gut (including *Ascaridia lineata* and *Heterakis gallinae*), and (4) those living on the host's tissue which is predigested by some histolytic glandular secretion before it is taken into the intestinal tract. It is concluded that the feeding habits of these worms bear little relation to the portion of the intestine in which they live and are mainly connected with morphological characters, mode of attachment, and the lesions they cause.—M. L. BINGHAM.

DISEASES, GENERAL

DOBBERSTEIN, J., & GOETTLER, V. (1942). Ist die Bekämpfung der Zuchtseuchen und Zuchtschäden durch Zuchtauswahl möglich? [**Possibilities of Controlling Breeding Diseases and Losses by Selective Breeding**].—*Züchtungskunde.* **17.** 158–169.

This is an educational article for breeders. Animals alive today are survivors of those exposed to disease in the past, and hence can be regarded as already resistant. The existence of chronic infections is evidence of acquired resistance. Many breeding tendencies of the past (inbreeding) have resulted in decreased, not increased, resistance. Breeding for early maturity and increased productivity is directly associated with decreased resistance: a reversal of breeding policy is required before increased resistance is to be expected.

A few attempts have been made to breed animals with a high immunity against a particular disease, but no notable success has resulted. What is required is animals with good natural resistance to the common disease hazards. Biological products or drugs should not be resorted to in order to save loss as a matter of policy, but only in emergency. Breeder and veterinarian must co-operate.

[The authors appear to be considering mammalian farm animals, otherwise they might have been expected to comment on progress in breeding fowls which are resistant to fowl paralysis or salmonella infection, as has been done in the U.S.A. and is recorded particularly in reports of agricultural experiment stations.]—J. E.

MAHLSTEDT, H. (1941). Die Ausrottung der Kälberkrankheiten auf gesundheitskünstlerischer Grundlage. [**The Eradication of Calf Diseases by Hygienic Means**].—*Tierärztl. Rdsch.* **47.** 220–224.

An account of farming conditions in East Prussia with reference to calf losses, which are due mostly to scours and lungworm invasion.

Improved housing and hygienic methods for calf rearing are described and are stated to have reduced losses.

PILLAR. (1940). Ueber die Wahl und die Anwendungstechnik von Impfstoffen bei der Prophylaxe und Therapie der Fohlenlähme. [**The Choice and Use of Biological Products to Prevent and Cure Joint-Ill in Foals**].—*Berl. Münch. tierärztl. Wschr.* Nov. 1st. 528–529.

P. advocates the immunization of pregnant mares with "Hipposanvakzine", said to be a polyvalent vaccine.—J. E.

I. SUMNER, H. (1942). **The Use of Brucella abortus Vaccine in Fistulous Conditions in Horses.**—*Vet. Rec.* **54.** 257–258.

II. DALLING, T. (1942). **The Use of** *Brucella abortus* **Vaccine in Fistulous Conditions in Horses.** [**Correspondence**].—*Ibid.* 297.

I. S. records the use of what he believed to be live *Br. abortus* vaccine on a case of "poll evil", with rather alarming results and also the use of dead *Br.*

abortus vaccine on other cases of " poll evil ", fistulous withers, quittor, and cases of foot wound in horses, all associated with necrosis of the deeper tissues. He shows that many of his cases gradually responded to repeated dosage until the discharges became less purulent, when a hyperaemic bulging of the sinus preceded the discharge of the necrotic tissue. As joint involvement of some of his foot cases appeared to be avoided by the treatment, he next tried the treatment in cases of open joint in other situations ; several recoveries are recorded. Some blood tests showed agglutinin titres in dilutions of 1 : 10–1 : 80 to *Br. abortus* in cases which later responded to treatment [the latter are low in comparison with some which have been noted in horses].

II. D. notes that SUMNER [see I] records the use of a live *Br. abortus* vaccine for his first case when, in fact, it was a dead *Br. abortus* vaccine of equine origin.
—C. V. WATKINS.

FOMINYKH, V. N. (1940). Patologo-morfologicheskie izmeneniya pri periodicheskom vospalenii glaz loshadeĭ. [**Pathological and Morphological Lesions in Periodic Ophthalmia in Horses**].—*Sovyet. Vet.* No. 11/12. pp. 80–82.

An account of histological studies made on the eyes of four horses affected with the acute stages of the condition. The whole process may be regarded, in F.'s opinion, as a panophthalmia. Five photomicrographs illustrate the findings.—A. MOLDAWSKY.

OLAFSON, P. (1942). **" Wobblers " Compared with Ataxic (" Swingback ") Lambs.**—*Cornell Vet.* **32.** 301–314.

" Wobbling " is a form of ataxia affecting thoroughbred foals and yearlings reared on limestone soils. O. compares symptomatology and lesions with " swayback " in lambs, and suggests that copper administration to pregnant mares be tried as a preventive measure.
—H. H. GREEN.

MELZER. (1942). Erfahrungen über schnelle Heilung akuter Hufrehe bei Pferden. [**Rapid Cure of Acute Laminitis in Horses**].—*Berl. Münch. tierärztl. Wschr.* May 1st. 136–137.

In addition to the treatment usually recommended for acute laminitis, M. advocates walking the animals slowly at least three times a day for half to one hour. It is claimed that this forced exercise is followed by immediate improvement and that the animal is cured within a week. The method proved very successful with army horses during the last war and M. hopes that it will become more widely known. The general symptomatic treatment advocated is described.
—E. G. WHITE.

IONOV, P. S. (1941). Morfologicheskie i biokhimicheskie izmeneniya krovi u loshadeĭ pri paraliticheskoĭ hemoglobinemii. [**Blood Changes in Equine Haemoglobinaemia Paralytica**].—*Veterinariya, Moscow.* No. 1. pp. 125–131. [French summary].

Repeated blood examinations of 35 affected horses showed an increase of erythrocytes, haemoglobin content, and specific gravity. The sedimentation rate of erythrocytes was decreased ; an increase in the rate during the course of the disease is regarded as an early favourable sign. The determination of the alkaline reserve is important for prognosis and for indication of therapeutic measures. The alkaline reserve was decreased by as much as 50%, and a decrease of 30–40% usually indicated a severe, fatal form of the disease. A condition of acidosis was accompanied by general leucocytosis, neutrophilia, the appearance of immature leucocytes, lymphopenia, and eosinophilia.
—A. MOLDAWSKY.

*RACKOW, H. G. (1941). Bau und Entstehung der stenosierenden Ringfalten in der Zitze des Rindes. [**Structure and Origin of Stenosing Ring Folds of the Teats of Cattle**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 569].

A case of diaphragm-like annular folds at the junction of gland and cistern in all four quarters of a first calf heifer is described and followed by records of observations on 252 slaughter cows, in which rudimentary ring folds were found in 6%. Their nature is discussed.

PONOMARENKO, F. M. (1940). Infektsionnyĭ katar dykhatel'nykh puteĭ krupnogo rogatogo skota. [**Infectious Respiratory Catarrh in Bovines**].—*Sovyet. Vet.* No. 11/12. pp. 1–4.

An outbreak of contagious broncho-pneumonia, of a type hitherto unknown in the U.S.S.R., occurred among 381 fattening animals on a farm belonging to a sugar factory. Most of the animals contracted the disease during a period of 18 months, 60 in a severe form, and seven died. The clinical symptoms and macro- and microscopical lesions are discussed. Bacteriological examination and attempts at artificial transmission yielded negative results. P. suggests that the infection is probably identical with infectious catarrh of the upper respiratory tract as described in European literature.—A. MOLDAWSKY.

LANGHAM, R. F., THORP, F., Jr., INGLE, R. T., & SHOLL, L. B. (1942). **Some Observations on the Pathology of Pneumonia in the Food-Producing Animals.**—*Amer. J. vet. Res.* **3.** 139–145.

A study was made of the pathology and bacteriology of the lungs of nine cattle, 12 sheep and ten pigs affected with bronchopneumonia. Lesions were confined mostly to the apical and cardiac lobes of the lungs and the disease appeared to start as an inflammation of the bronchioles. β-streptococci (Lancefield's Group C) were isolated from four of the bovine lungs, *Pasteurella oviseptica* from eight of the sheep's lungs, and *Past. suilla* together with β-streptococci from four of the porcine lungs.—J. C. BUXTON.

GILMAN, A., & LINDSBERG, G. E. (1942). **The Effect of Pneumococcal Lobar Pneumonia on the Histamine Content of the Lung.**—*Yale J. Biol. Med.* **14.** 387–393. [Authors' conclusions copied *verbatim*].

Experimentally induced pneumococcal lobar pneumonia in the dog failed to cause a significant release of histamine from the infected lung. Although the histamine concentration of the consolidated lobe was reduced, this was demonstrated to be due to the increased weight of the lung brought about by the inflammatory reaction. The total histamine content remained essentially unchanged.

SIBREE, E. W. (1941). **Gas Tensions in the Tissues in Pathological Conditions.**—*Med. J. Aust.* Feb. 15th. 201–206.

Gas tensions in the tissues of resting normal subjects vary considerably from time to time. Tensions of 41–53 mm. mercury for carbon dioxide, and of 12–24 mm. for oxygen, are considered normal.

In one case of pulmonary oedema, two of asthma, and one of chronic bronchitis with emphysema, CO_2 tensions were as high as 68, 72, and 76 mm., but fell to the upper limit of normal (50–55 mm.) after treatment. O_2 tensions showed little change. In circulatory disturbances, especially those associated with congestive failure, similar readings were obtained, CO_2 tensions in two cases being 68 and 72 mm.

Anaemia with haemoglobin values ranging from 30–60%, acidosis, alkalosis, and slowly developing disturbances of metabolism, such as thyrotoxicosis, do-

not seem to alter tissue gas tensions, except when death is imminent, because of compensatory changes in the respiratory cycle.

Infection causes a local rise in CO_2, and a fall in O_2 tensions, which become general immediately before death.—A. W. Banks.

Robscheit-Robbins, F. S., & Whipple, G. H. (1941). **Hemoglobin Production Increased with Severity of Anemia.**—*Amer. J. Physiol.* **134.** 263–267.

The normal haemoglobin level in the dogs used in the experiments was 20–21 g. Hb. %. The rate of regeneration of haemoglobin in dogs at a "severe" anaemia level (6 g. %) and at a "moderate" anaemia level (11 g. %) was studied and it was found that the severe level of 6 g. % gave a maximum stimulus for the production of new haemoglobin, whereas the level of 11 g. % gave two-thirds of this maximum, indicating that the production over this range was roughly parallel to the degree of anaemia.—F. Aylward.

Crossley, M. L., Kienle, R. H., Vassel, B., & Christopher, G. L. (1941). **The Chemistry of Infectious Diseases. III. Polarographic Studies of the Effect of Denaturing Agents and Enzymes on Blood Sera of Normal and Pneumococcus-Infected Dogs.**—*J. biol. Chem.* **140.** No. 1. xxxi–xxxii. [For previous parts, see *V. B.* **12.** 459].

Polarographic studies are carried out on the sulphosalicylic acid filtrates from undenatured and alkali denatured sera from normal and pneumococcus-infected dogs. The structure of the typical protein double wave of undenatured filtrates remains unaltered throughout infection, while alkali denaturation causes a disappearance of the double wave. This effect is most rapid for sera from severely infected dogs and becomes slower with a decrease in the severity of the infection.

Detergents when added to normal or infected sera cause no change which can be detected with the polarograph. Trypsin and pepsin exert no effect on normal sera which cannot be duplicated on infected sera, but tryptic digestion liberates polarographic active groups which increase the wave height only, while pepsin causes a disappearance of the double wave in addition to an increase in wave height.—F. Aylward.

I. Bogart, R., & Muhrer, M. E. (1942). **The Inheritance of a Hemophilia-like Condition in Swine.**—*J. Hered.* **33.** 59–64.

II. Muhrer, M. E., Hogan, A. G., & Bogart, R. (1942). **A Defect in the Coagulation Mechanism of Swine Blood.**—*Amer. J. Physiol.* **136.** 355–359.

III. Mertz, E. T. (1942). **The Anomaly of a Normal Duke's and a very Prolonged Saline Bleeding Time in Swine Suffering from an Inherited Bleeding Disease.**—*Ibid.* 360–362.

I. A haemophilia-like condition was observed in a strain of Poland China pigs maintained at the Missouri Agricultural Experiment Station [see also Hogan *et al.* —*V. B.* **12.** 387]. The condition developed usually at about two months of age and increased in severity with age. As in man, there was a deficiency of thromboplastin, which, when added to a sample from a "bleeder" pig, caused normal coagulation; all other clotting elements were present.

The condition was hereditary. The progeny of "bleeder × bleeder" matings were all haemophilics, and from the results of the mating of normal with "bleeder" pigs it was concluded that the character for haemophilia was due to a recessive gene, variations in severity being attributed to modifying genes. There was no evidence that the character was sex-linked.

Both external and internal haemorrhages were encountered in haemophilic pigs. Joint haemorrhages were noted in some instances and all which were castrated bled to death.

II. Attempts were made to find a suitable diagnostic test for haemophilia in pigs. Of the various methods employed, the fibrin precipitation test proved the most satisfactory. When one ml. of citrated plasma is mixed with a stirring rod after addition to 48 ml. of normal saline and 1 ml. of 2·5% $CaCl_2$, a mass of fibrin forms within 16–20 min. in the case of normal pigs, whereas samples from the "bleeder" animals required about 35 min.

The whole-blood coagulation time and the fibrin precipitation time were both markedly reduced following intramuscular or intravenous injection of 5–10 mg. of dried blood-globulin (in 2 ml. saline) per lb. body weight. This measure is therefore of some therapeutic value.

III. The saline bleeding time, *i.e.* the bleeding time of a wound which is immersed in saline at 37°C. was under 100 seconds (average, 74 sec.) in normal pigs, and well over 400 sec. in the case of haemophiliacs. Duke's bleeding time *i.e.* the time taken to clot when the blood is blotted at 30-sec. intervals with coarse filter paper, was, however, of the same order (average, 102 and 103 sec. respectively) in both normal and affected animals.—Alastair N. Worden.

Asmundson, V. S. (1942). **Skeletal Abnormalities of Short Spined Turkeys.**—*Proc. Soc. exp. Biol., N.Y.* **50.** 120–123.

An abnormality is described characterized by a crowding together of the vertebrae, thus producing a shortening of the neck and body of turkey embryos. The data obtained indicated that it was a simple autosomal recessive lethal mutation.—F. D. Asplin.

NUTRITIONAL AND METABOLIC DISORDERS

Schultze, M. O. (1942). **The Isolation of Protoporphyrin IX from Feces of Normal and Anemic Rats.** —*J. biol. Chem.* **142.** 89–96.

Protoporphyrin IX was isolated from the faeces of anaemic Cu-deficient rats, of anaemic Fe-deficient rats, of normal rats on a milk diet, and also of normal rats on a solid diet. This indicates that either the animal or the intestinal flora can synthesize this pigment on a diet very low in Cu. Porphyrins were not detected in the urine of Cu-deficient rats.—J. P. Gardner.

Shaw, J. C., Powell, R. C., Jr., & White, G. C. (1942). **Studies on Ketosis in Dairy Cattle. IV. The Effect of Glucose Therapy and Pasture Feeding in Cases of Clinical Ketosis.**—*J. Amer. vet. med. Ass.* **100.** 473–478. [Part I in press, parts II & III not traced].

Four cases of post-parturient hypoglycaemic ketosis are recorded in which the effects of glucose therapy were followed by periodic estimations of ketones in blood and urine. Blood fat values were included in one case, lactic acid in three, and glucose in all four.

Intravenous injection of 250 g. glucose was followed by a decline in blood ketones within two hours, but the effect was evanescent. A second injection 36 hours later gave similar results, and permanent improvement of appetite only occurred after a third injection associated with pumping of 6 lb. of glucose into the rumen.

Decline of the blood ketones to normal followed in 4–11 hours; 3 lb. of syrup were then fed over the ensuing fortnight, with complete recovery. Persistent glucose therapy is generally required to secure permanent recovery in severe cases, immediate effects of injection being supported by substantial daily feeding of 2 lb. or more. Pumping of large quantities of glucose (6 lb.) into the rumen rapidly abolishes ketosis but may have an adverse effect on appetite. Molasses feeding as a preventive measure is not always effective and low carbohydrate intake should not be regarded as the primary cause of the disorder. Turning out to pasture is sometimes followed by dramatic recovery, but the authors observed several cases of ketosis in cows already at pasture.

In the four cases of ketosis studied in detail, blood lactic acid was above the usual normal level. Massive administration of glucose *via* the rumen was followed by a pronounced temporary rise in lactic acid. Ketone partitions, carried out in one case of recurrence of ketosis, showed the blood rise chiefly as β-hydroxybutyric acid and the urinary rise chiefly as acetone and acetoacetic acid.—ALEX. B. PATERSON.

CLARK, R., & GROENEWALD, J. W. (1941). **Pregnancy Disease, or " Domsiekte ", in Ewes.**—*J. S. Afr. vet. med. Ass.* **12.** 97–102.

In typical cases a severe fatty infiltration of the liver is found P.M. After the first nervous symptoms, the animals show dullness and stupidity and eventually become comatose. In South Africa the condition can be produced experimentally by suddenly reducing the rations of the ewes when four months pregnant. In the absence of sufficient carbohydrate a hypoglycaemia occurs with incomplete oxidation of fat resulting in a fatty infiltration of the liver. Under natural conditions a similar sudden starvation may occur due to lack of food, inclement weather, a sudden change in environment or disturbances of the digestive tract. In treatment administration of glucose has given good results and stimulation of the rumen by drugs such as " lentin " is recommended. Force feeding of high protein food such as meat meal may have to be resorted to in order to induce the sheep to commence feeding again. [A fuller account is to appear in the *Onderstepoort J. vet. Sci.*]—E. M. ROBINSON.

*HOFLUND, S. (1941). **[Some Clinical Experiences with Deficiency and Digestive Diseases of Sheep].**—*Svensk VetTidskr.* **46.** 225–233, 243–255 and 282–297. [Abst. from translation in *N. Amer. Vet.* **23.** 27–31, 92–97, 108 and 253–258].

There have been extensive changes in sheep husbandry in Sweden during the past 20 years, many small flocks of native stock having been replaced by large sheep farms containing stock which has been graded-up by imports from Great Britain. There have been increases in the degree of parasitism and in the incidence of deficiency diseases, both increases being attributable to the changed methods of management. The incidence of diseases at the present time is reviewed, and discussed in relation to the relevant literature and to clinical experience gained at the Stockholm Veterinary High School.

The first article deals with inanition, which is widespread, and with a condition termed *skravelsjuka*: the latter, characterized by wasting, lowered fertility, and weakly lambs, was common following the importation of high-grade sheep, but is of infrequent occurrence today. It is associated with the feeding of poor quality hay.

The second article deals with ketosis (which appears to be common), protein overfeeding, puerperal paresis, " grass tetany " (encountered in one flock only), and urinary calculi.

In the third article, an outbreak of abortion in a flock of Oxford Down and Shropshire ewes is described, and it is suggested that poor quality hay may have been an aetiological factor. H. states that in his experience muscular degeneration has never occurred in the lambs of any flocks in which the ewes have been fed sufficient roots, ensilage, wheat bran, and fir, juniper or spruce twigs: good results are said to have followed vitamin B and C therapy in the treatment of this syndrome. Xerophthalmia has been successfully treated by feeding additional carrots to the ewes and fish liver oil to both ewes and lambs.—ALASTAIR N. WORDEN.

KEITH, T. B., MILLER, R. C., THORP, W. T. S., & MCCARTY, M. A. (1942). **Nutritional Deficiencies of a Concentrate Mixture Composed of Corn, Tankage, Soybean Oilmeal, and Alfalfa Meal for Growing Pigs.**—*J. Anim. Sci.* **1.** 120–125.

During experiments designed to determine the protein requirements of the growing pig, 30 out of 51 animals of 150 lb. live weight developed stiffness. Analysis of the rations employed, which had total mineral contents of 6–9%, indicated manganese contents of only 0·0011–0·0014%. Addition of 50–60 p.p.m. of Mn (as the sulphate) prevented further occurrence of stiffness but did not cure it in affected cases.

In a later experiment, vomiting, diarrhoea, anorexia, cessation of growth, and ataxia were encountered in young pigs (26–40 lb. live weight), receiving a basal diet of yellow maize 60, low-protein tankage 35, alfalfa 4, and salt 0·5. Recovery occurred in animals which were fed vacuum-dried whole beef-liver, or a mixture of yeast, carotene, and soybean oil-meal. Yeast alone, or a combination of various B vitamins, did not cure the condition.—ALASTAIR N. WORDEN.

PAGE, D. (1942). **Rabbit-Feeding in War Time.**—*Emp. J. exp. Agric.* **10.** 103–116.

P. has made a critical study of the food requirements of breeding rabbits and their young during three generations to test the substitution of potatoes (cooked and fed in a semi-dry, warm state) for the cereal ration as now allowed by the Ministry of Agriculture. Potatoes replaced oats satisfactorily, but had to be fed in large quantities to lactating does if all the young in large litters were to be reared.—C. V. WATKINS.

DAFT, F. S., SEBRELL, W. H., & LILLIE, R. D. (1942). **Prevention by Cystine or Methionine of Hemorrhage and Necrosis of the Liver in Rats.**—*Proc. Soc. exp. Biol., N.Y.* **50.** 1–5.

Using basal diets identical with, or similar to, those previously employed [see *V. B.* **12.** 351 and 390], the authors were able to prevent hepatic cirrhosis by the addition of choline or methionine, and to prevent hepatic haemorrhage and necrosis by the addition of cystine or methionine. They suggest that the two conditions are entities.—ALASTAIR N. WORDEN.

BURR, G. O. (1942). **Significance of the Essential Fatty Acids.**—*Fed. Proc. Amer. Soc. exp. Biol.* **1.** 224–233.

The term " essential fatty acids " denotes a group of unsaturated fatty acids which will cause renewed growth in rats maintained on a low fat diet. These acids, so far, comprise the pure acids linoleic, linolenic, and arachidonic. Rats are unable to produce essential fatty acids in any quantity by the chemical processes of desaturation, dehydration, trans-cis rearrangements or shift of double bonds along the C chain. Exclusion of fat from the diet leads to (a) scaly skin and caudal necrosis, (b) retarded growth, (c) kidney lesions and haematuria, and (d) early death. Less specific effects

include histological changes in the reproductive organs; loss of ovulation, reproduction and fertility in the female; male sterility; excessive water consumption, and high respiratory quotient and basal metabolic rate. Criteria of fat deficiency depend upon various factors; scaliness of the tail, for example, is considerably affected by the humidity of the atmosphere.

Details are given for the assay of fatty acids in rats. There is no evidence for the existence of biologically inactive isomers of linoleic and linolenic acids. The daily requirement of the rat for linoleic acid seems to be about 20 mg. Very few experiments have been carried out with other species, but there is some indication of a relationship between deficiency or low intake of unsaturated fatty acids and eczematous conditions in human beings. Over recent years there have been increasing numbers of publications dealing with the interrelationship of unsaturated fatty acids and other essential constituents such as vitamin B_6, pantothenic acid, egg white injury or biotin deficiency, riboflavin, carotene and vitamin A.

The mode of action of unsaturated fatty acids in preventing or curing abnormalities associated with their lack is unknown. They undoubtedly function as essential components in cell structure and mobile lipoids. There is a definite relationship between linoleic acid and the health of the skin, and this acid has a particular sparing action on those vitamins affecting the skin. For this reason, and for that of the remote effects of vitamin deficiencies upon other organs in the body, linoleic acid should be plentifully supplied in the diet.—A. Eden.

Schultze, M. O., & Simmons, S. J. (1942). **The Use of Radioactive Copper in Studies on Nutritional Anemia of Rats.**—*J. biol. Chem.* **142.** 97–106.

A radio-active isotope of copper was fed to rats deficient in iron or copper, in an effort to trace the distribution of amounts of Cu not detectable by ordinary chemical means. The rats were killed after 24 or 48 hours of Cu therapy. The excreta, blood, and various organs and tissues were analysed separately for radio-active Cu. Cu-deficient rats retained more of a single therapeutic dose of Cu than did Fe-deficient rats; in both groups only a small fraction of the Cu fed was retained. The kidney, liver, and bone marrow retained the highest relative concentrations. Entrance of Cu into the bone marrow was demonstrated.—J. P. G.

Yoshikawa, H., Hahn, P. F., & Bale, W. F. (1942). **Red Cell and Plasma Radioactive Copper in Normal and Anemic Dogs.**—*J. exp. Med.* **75.** 489–494.

Radio-active Cu was fed to both normal and anaemic dogs mixed with the food, and its appearance in the blood plasma and red cells was determined by means of the usual technique employing a modified Griger-Muller counter. The Cu rapidly found its way into the plasma reaching a peak in 2–5 hours, after which it abruptly decreased, although some of the radio-active Cu was still present after two days. The Cu also appeared rapidly in the r.b.c. with a slow but gradual increase in concentration over two days. In those dogs where haematopoietic activity was accelerated following inducement of anaemia by haemorrhage, there was some evidence that the uptake of radio-active Cu was somewhat more extensive. It is suggested that this may have been due to a greater adsorption of Cu by the newly formed r.b.c.—Alfred Eden.

Philp, R. C. T., & Wherrett, A. B. (1942). **"Coastiness" in Cattle.**—*Tasm. J. Agric.* **13.** 22–23.

It has been shown that sheep can be maintained in perfect health on "coasty" country either by top-dressing with Cu and Co salts or by providing licks containing Cu and Co. [See *V. B.* **10.** 784, and **12.** 46.] It is now reported that a cow in a very advanced stage of "coasty disease" made a rapid recovery after administration of drenches and licks containing Cu and Co. During the whole period of treatment the animal was on "coasty" country.—R. Allcroft.

Madsen, D. E., & Nielsen, H. M. (1940). **The Relationship of Parturient Hemoglobinemia of Dairy Cows to Aphosphorosis.**—*N. Amer. Vet.* **21.** 81–89.

In a previous paper [*V. B.* **10.** 695.] the authors reported that a hypophosphataemia was always present in milch cows affected with parturient haemoglobinaemia. In the present paper, further evidence is produced to support the theory that the disease is associated with aphosphorosis. It is shown that the rations of alfalfa and sugar-beet pulp commonly fed in Utah and Idaho do not supply the minimum P requirement and that aphosphorosis exists in nearly all herds of dairy cows where parturient haemoglobinuria occurs. Reports from areas in Europe where the disease occurs also indicate that the disease is most commonly found where rations deficient in P are fed, *e.g.* beets and mangels. The intravenous injection of 30 g. of dibasic sodium phosphate, combined with the administration of sodium phosphate or bone meal in drenches, quickly corrects the hypophosphataemia found in parturient haemoglobinuria. The results of a chemical examination of the blood plasma and the rations suggest that a P deficiency is a factor contributing to the cause of the disorder. Further studies are needed to determine the specific cause of the haemolysis.—N. J. Scorgie.

Groenewald, J. W., Thomas, A. D., & du Toit, B. A. (1940). **Experimental Osteodystrophic Diseases in Goats.**—*Onderstepoort J. vet. Sci.* **15.** 299–309.

In the experimental work carried out, rib-resections were made periodically for histopathological studies; the advantage of bone biopsy was clearly demonstrated and the progressive development of the osteodystrophic conditions could be studied. All the animals were bled monthly for the determination of blood calcium and inorganic phosphorus and internal parasites were carefully controlled. The four groups included goats on (1) a low Ca and high P diet, (2) a high Ca and low P diet, (3) a low Ca and low P diet, and (4) sufficient Ca and P diet. Rickets was observed in group (2) in only one case, but in all cases in group (3). Starvation proved to be an important factor in the development of bone atrophy in group (1). The inhibition of growth due to semi-starvation resulted in the eventual development of bone atrophy and not osteofibrosis.—E. M. R.

Clark, R., Thomas, A. D., & Schulz, K. C. A. (1941). **An Unusual Case of Rickets in a Dog.**—*J. S. Afr. vet. med. Ass.* **12.** 73–80.

A case is described of rickets in a dog apparently due to an hereditary factor. The dog was bred from a son of a Rhodesian Ridgeback which had fathered a number of pups which developed rickets. The case in question developed symptoms of rickets at about four months old and became steadily worse until its death six months later. Very marked rachitic changes occurred in the bones, particularly those of the legs. Classical rachitic changes were seen in sections of the bones and the case was complicated by the occurrence of a marked aplastic anaemia. The diet of the dog appeared to be adequate in all respects. The blood phosphorus was normal and there was no lack of vitamin D. Two dogs of the same litter fed on the same diet were normal in all respects.—E. M. Robinson.

Boyer, P. D., Phillips, P. H., Lundquist, N. S., Jensen, C. W., & Rupel, I. W. (1942). **Vitamin A and Carotene Requirements for the Maintenance of**

Adequate Blood Plasma Vitamin A in the Dairy Calf.—*J. Dairy Sci.* **25.** 433–440.

In experiments carried out with six calves and lasting just over a year, it was shown that gains in weight took place when the plasma vitamin A value was about 10 μg. or more per 100 ml., whereas inhibition of growth occurred at lower levels. Symptoms of deficiency invariably developed when the plasma vitamin A fell to 4–6 μg. or less per 100 ml. The daily vitamin A intakes required to maintain deficient, borderline, and adequate concentrations of plasma vitamin A were assessed at 6, 12, and 18 μg. respectively.

It is held that the blood plasma vitamin A value is a more delicate measure of the state of vitamin A nutrition in the calf than those based on growth or plasma carotene values. When plasma vitamin A was adequate, the plasma carotene values ranged from 50–140 μg. per 100 ml., being higher in Holsteins than in Guernseys.—ALASTAIR N. WORDEN.

MADSEN, L. L., HALL, S. R., & CONVERSE, H. T. (1942). **Cystic Pituitary in Young Cattle with Vitamin A Deficiency.**—*J. Nutrit.* **24.** 15–24.

Of a total of 15 vitamin A deficient cattle of varying age, breed, sex, and nutritional history, cysts were detected in the pituitary gland in 13 cases. The cysts were usually large, filled with serous fluid, and situated either between the anterior and posterior lobes or within the posterior lobe of the gland. One was found in an animal which had been deficient in vitamin A early in life but had received adequate amounts of carotene since. The condition is illustrated by photographs.

Among pituitaries collected at slaughter from over 10,000 normal cattle, cysts were found in under 0·05% of cases.—ALASTAIR N. WORDEN.

I. SENIOR, B. J. (1940). **The Requirements of the Pig for Vitamins A and D.**—*Sci. Proc. R. Dublin Soc.* **22.** 229–236.

II. SENIOR, B. J. (1941). **The Vitamin D Requirements of the Growing Pig.**—*Ibid.* 379–385.

I. Results of experiments on four groups each of six pigs maintained on the same basal diet containing 1·57–1·77% Ca and 1·16–1·30% P and deficient in vitamins A and D, showed that vitamin D is necessary for the prevention of rickets even with adequate Ca and vitamin A intake and a Ca : P ratio of about 1·4 : 1.

II. Further experiments in which the Ca : P ratio was varied showed that, although no adjustment of the Ca or P content of a ration will render the pig independent of supplies of vitamin D, an adequate intake of the vitamin enables the Ca : P ratio to be varied within wide limits.

CORRELL, J. T., & WISE, E. C. (1942). **A Study on the Administration of Hesperidin, Ascorbic Acid, and Massive Doses of Vitamin D to Vitamin K-Deficient Chicks.**—*Poult. Sci.* **21.** 256–259.

It was thought that the fragility of capillaries resulting in haemorrhages in chicks with vitamin K deficiency might be due to some factor distinct from vitamin K ; in the tests here reported neither hesperidin, ascorbic acid, nor large doses of vitamin D had any effect upon the development of haemorrhages in vitamin K depleted chicks.—F. D. ASPLIN.

*ENDER, F., & HELGEBOSTAD, A. (1941). **[Beriberi Associated with Herring Feeding to Foxes].**—*Norsk VetTidsskr.* **53.** 297–313. [Abst. from abst. in *Wien. Tierärztl. Mschr.* **29.** 216].

The exclusive or nearly exclusive feeding of foxes on herrings caused convulsions, ataxia, and paralysis, curable by thiamin, and so regarded as beriberi. Feeding tests on rats indicated that the herrings had an extremely low vitamin B_1 content. Foxes fed on a diet of whale meat did not contract the disease. [See also EVANS *et al.*—*V. B.* **12.** 462.]

I. CALDER, R. M. (1942). **The Influence of Vitamin B Deficiency on Experimental Liver Necrosis.**—*J. Path. Bact.* **54.** 355–368.

II. CALDER, R. M. (1942). **The Protective Action of Xanthine and Other Insoluble Substances on the Liver.**—*Ibid.* 369–373.

I. The degree of liver necrosis following the subcutaneous injection of chloroform into rats was decreased when the diet was deficient in a thermolabile factor present in yeast but distinct from vitamin B_1. This factor " N ", as C. terms it, is considered to be possibly identical with Elvehjem's " factor W " [see *V. B.* **10.** 786]. The necrosis was more severe in the absence of N if choline was present in adequate amounts than if the diet was choline-deficient also. Conversely, necrosis was severe when the diet contained adequate N but was deficient in choline. Necrosis was less marked when both factors were absent or when both were present in adequate amounts.

II. It had previously been shown that the subcutaneous injection of xanthine into rats not only induced a local inflammatory reaction but also protected the liver against necrosis when the animal concerned was subsequently injected subcutaneously, at a different site, with chloroform. C. demonstrated that a variety of substances acted in similar fashion, the powers of inducing local inflammation and of protecting the liver following the serial order : India ink, charcoal, xanthine, red blood corpuscles, carborundum. There was no detectable absorption of chloroform by the injected substances.

The protective action of xanthine and other substances is therefore nonspecific, and C. suggests that the local inflammatory reaction which occurs may lead to a general stimulation of leucopoietic tissue, thus producing the protective action. [The ability of local irritants to confer systemic protection appears to be in keeping with the theories underlying the somewhat harsh counter-irritation measures still adopted in veterinary practice.]—ALASTAIR N. WORDEN.

CRAVENS, W. W., SEBESTA, E. E., HALPIN, J. G., & HART, E. B. (1942). **Effect of Biotin on Reproduction in the Domestic Fowl.**—*Proc. Soc. exp. Biol., N.Y.* **50.** 101–104.

Supplements of 15 μg. of biotin concentrate per 100 g. ration or 3% kidney residue to a diet low in biotin improved the hatchability of fertile eggs from 10 to 80%. Although the number of hens under experiment was small the results appear to be significant.
—F. D. ASPLIN.

I. MILLER, D., & TITUS, H. W. (1942). **Gizzard Lesions in Day-Old Chickens.**—*Poult. Sci.* **21.** 203–211.

II. MILLER, D., & HAMMOND, J. C. (1942). **Gizzard Erosion in Growing Chickens.**—*Ibid.* 317–320.

I. The incidence of gizzard lesions in 28,428 day-old chicks examined was 99·3%. This figure is higher than that previously reported by the same authors but they attribute this to improvement in skill in detecting the lesions. The severity of lesions decreased from the time of hatching until the sixth day. Subsequent severity depended upon the diet of the chicks.

A long list is given of substances which, when fed to the parent hen, exerted no effect on the incidence of gizzard lesions in newly hatched chicks. A second list is given of substances which, when injected into the

embryonated eggs, were without effect on the incidence of gizzard lesions.

II. In chicks which had haemorrhagic lesions in the gizzard lining at hatching [see I], the resulting lesions after seven days were not severe, regardless of the diet fed. The severity of gizzard lesions developing after the first week was dependent upon the quantity of anti-gizzard erosion factor present in the diet. The lability of the gizzard factor was demonstrated by its inactivity after treatment with ethyl ether and by addition of 2% cod liver oil to the diet. This confirmed the earlier observations of ALMQUIST [*V. B.* **9.** 108].
—F. D. ASPLIN.

SHCHEPETOV, F. N., & OVSYANNIKOVA, A. V. (1941). Primenenie askorbinovoĭ kisloty pri nekotorykh zabolevaniyakh porosyat. [**Use of Ascorbic Acid in the Treatment of Certain Diseases of Piglets**].—*Veterinariya, Moscow.* No. 3. pp. 130–133. [French summary].

A report of the beneficial effect of injections of ascorbic acid and alcohol in unthrifty piglets.—E. R. P.

PHYSIOLOGY

—. (1942). **Annual Review of Physiology. Volume IV.** [Edited by LUCK, J. M., & HALL, V. E.] pp. viii+709. California, Stanford University P.O.: Annual Reviews, Inc. [8vo] [$5.00].

All the authors contributing to this latest volume are American and much of the material reviewed is that of American workers, but, as is pointed out in the preface, not much has been contributed from European countries during the last few years; also the number of investigators normally engaged in physiological research is far greater in the U.S.A. than elsewhere. A wide range of subjects has been dealt with as the following list of contents will show:– Permeability, by L. R. BLINKS; The Physiological Effects of Neutron Rays, by P. C. AEBERSOLD & J. H. LAWRENCE; Physiological Aspects of Genetics, by H. H. STRANDSKOV; Developmental Physiology, by H. L. HAMILTON & B. H. WILLIER; Water Metabolism, by J. P. PETERS; Growth by G. S. AVERY, Jr.; Energy Metabolism, by W. H. CHAMBERS, E. SHORR & S. B. BARKER; The Physiology of the Skin, by P. C. BAIRD, Jr., W. F. LEVER & T. D. SPIES; The Peripheral Circulation, by A. B. HERTZMAN; Heart, by M. B. VISSCHER; Blood, by H. P. SMITH; The Digestive System, by E. J. VAN LIERE; Kidney, by J. A. SHANNON; Electrophysiology, by R. W. GERARD; The Spinal Cord and Reflex Action, by T. C. RUCH; The Central Nervous System, by M. HINES; The Autonomic Nervous System, by K. HARE & J. C. HINSEY; Sense Organs, by H. K. HARTLINE; Metabolic Functions of the Endocrine Glands, by C. N. H. LONG; The Physiology of Reproduction, by F. L. HISAW & E. B. ASTWOOD; Physiological Psychology, by C. P. RICHTER; Applied Physiology, by A. R. BEHNKE & C. S. STEPHENSON; The Pharmacology of Drug Addiction, by M. I. SMITH.

Perhaps the two chapters entitled "Blood" and "The Physiology of Reproduction" will be of most interest to veterinary readers, and the more recent literature on these subjects is well dealt with; the first contains references to 320 original papers and the second to 486. The whole volume contains references to nearly 4,000 original papers and a good and extensive index is given.—R. ALLCROFT.

GRANT, J. C., MILLER, P. G., & WORDEN, A. N. (1942). **The Health of Dairy Cattle: Observations on Ayrshire Cows Utilised as the Subject of a Nutritional Experiment (Aberdeenshire, August-October, 1941).**—*Vet. J.* **98.** 72–96.

A record of physiological observations on 26 dairy cows collected over a two-months' period during which the animals were the subjects of a nutritional experiment. The observations included heart- and respiration- rates, rectal temperatures, rates of grazing and cudding, irritability, and skin-fold thickness. An attempt was made to form a true picture of the health of each individual by assigning to it a "health index" at intervals throughout the experiment. The "health index" was computed from a consideration of alertness, skin handling, general form, and character of the mucous membranes. The necessity of utilizing such physiological data in the interpretation of nutritional experiments is emphasized.
—N. J. SCORGIE.

KORENCHEVSKY, V. (1942). **Natural Relative Hypoplasia of Organs and the Process of Ageing.**—*J. Path. Bact.* **54.** 13–24.

The relative weights of the organs were examined in 509 normal rats of different ages which were used as controls during endocrinological experiments carried out in 1934–41. The figures are compared with those of certain organs from human beings at ages from birth to over 70, the human data being obtained from 4,635 pathological cases and 159 in which death was due to accidental causes.

In the rat, relative hypoplasia of a number of organs begins as early as 2–3 weeks after birth. The inadequate human data suggest that the same process occurs at an early age, although it is less developed than in the rat. It would seem that the process of hypoplasia develops with advancing age and finally results in senile atrophy.

The results of psychological, ergographic, and sensory tests in the Galton laboratory afford evidence that the process of ageing for some human organs starts at the age of 10–25 years.—E. G. WHITE.

EVANS, P. (1942). **Blood Viscosity.**—*Lancet.* **242.** 162–166.

The viscosities of oxalated blood, plasma, and corpuscles and haematocrit values were estimated on 50 healthy and convalescent persons. The values obtained for blood viscosity were similar to those obtained by investigators who used fresh blood; the plasma viscosity was slightly lower and the corpuscular viscosity varied between 12·5 and 14 times that of water. In pregnant women plasma and corpuscular viscosities were similar to those of non-pregnant women, but there was a parallel reduction in the blood viscosity and haematocrit value. Parturition resulted in an increase in the mean viscosity of plasma and blood, and the mean haematocrit value. Blood transfusion for haemorrhage retarded the reduction in viscosity due to the haemodilution of haemorrhage, while blood transfusion for anaemia resulted in little change in blood viscosity. The transfusion of plasma reduced blood viscosity considerably.—J. P. GARDNER.

*NEIMEIER, K. (1939). Röntgenologische Beobachtungen am Magen-Darmkanal des Schweines. [**X-Ray Observations on the Gastro-Intestinal Canal of the Pig**].—*Inaug. Diss., Hanover.* pp. 55. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 6].

N. describes the mechanism of gastro-intestinal digestion of swine, his conclusions being based on radiological studies of the alimentary tracts of five pigs.

The abstract from which this is taken contains considerable detail and should be consulted by those interested.—M. LANDAU.

I. TAYLOR, E. L. (1940). **The Demonstration of a Peculiar Kind of Coprophagy Normally Practised by the Rabbit.**—*Vet. Rec.* **52.** 259–262.

II. SOUTHERN, H. N. (1942). **Periodicity of Refection in the Wild Rabbit [Correspondence].**—*Nature, Lond.* **149.** 553–554.

I. T. sets out in greater detail the experimental work confirming the observation of MADSEN [*V. B.* **10.** 635.] that the rabbit normally passes two kinds of faeces, the ordinary dry pellet type and a softer type, usually passed at night, which is taken by the rabbit direct from its own anus and re-swallowed. Photographs of both types are given. T. proposes a new term "pseudo-rumination" for this peculiar type of coprophagy, defining it as "a process of alimentation which involves a special rhythm of the caecum, resulting in the production of two kinds of faeces one of which is taken directly from the anus and reingested by the animal". He also observes that the process appears to take place in tame rabbits in the early morning but that there is some evidence suggesting that in wild rabbits "pseudo-rumination" occurs later in the day.

II. Examination for soft faecal pellets of the stomachs of wild rabbits, shot at various periods throughout the day, suggests that there are two periods during the 24 hours when physiological faecal refection occurs [see also papers by MADSEN, TAYLOR, and EDEN —*V. B.* **10.** 635]. The main period is during the hours of daylight (6 a.m. to 4 p.m.) with a subsidiary peak from 9 p.m. to 2 a.m. These findings amplify those of TAYLOR [see I], but S. emphasizes that they may only apply to the time of the year (March) when day and night are of approximately equal duration. The observations are somewhat confirmed by records of the feeding habits of wild rabbits which are most active eaters at dusk and just before and after dawn. S. further suggests that changes in the rhythm may occur with the shorter nights of summer since less time is available for feeding.
—ALFRED EDEN.

SCOTT, L. D. (1940). **The Concentration and Detoxification of Human Urine for Biological Pregnancy Diagnosis.**—*Brit. J. exp. Path.* **21.** 320–324.

A rapid and simple method is described for the routine preparation of gonadotropic hormone extracts from human urine for biological pregnancy tests. The method is based on the adsorption of kaolin at pH 4·0. Extracts so prepared do not cause the disturbing symptoms that sometimes arise in the test animals from native urine injections or extracts prepared by the alcohol or acetone techniques. Urine samples from 1,000 cases using the new method of preparation were simultaneously tested by the Friedman and Hogben tests and in no case was an incorrect result obtained.—N. J. SCORGIE.

NALBANDOV, A., & CASIDA, L. E. (1942). **Ovulation and its Relation to Estrus in Cows.**—*J. Anim. Sci.* **1.** 189–198.

In a total of 72 oestral periods in 22 dairy cows, ovulation occurred in 68 instances on the average 14 hours (range 1–22 hours) after the end of oestrus. In two cases ovulation was delayed till 47–104 hours, whilst in two cases the follicle regressed without ovulation taking place. In a parallel series of investigations with beef cattle the average time of ovulation was almost identical. In the beef group, one animal on two occasions ovulated during oestrus. The observed distributions of the data for both time of termination of oestrus and time of ovulation were markedly different from those expected on the supposition that these events are equally likely to occur at any hour during the 24-hour day. Thus, it was found that in the majority of cases the termination of oestrus occurred between 4 p.m. of the day on which heat began and 4 a.m. the next morning, and that ovulation occurred between 6 a.m. and 6 p.m. of the next day.—N. J. SCORGIE.

*POLOVTSEVA, V. V. (1940). **[Rhythmic Uterine Contractions in Sheep during the Various Stages of the Sexual Cycle].**—*Vestn. sel'skokhoz. Nauk. Zhivotn.* No. 1. pp. 127–138. [In Russian] [Abst. from abst. in *Z. Tierz. ZüchtBiol.* **52.** 115].

Direct observations were made on 30 cases by laparotomy openings and in 122 cases uterus horn fistulae were prepared.

It was observed that oestrus occurred as soon as ripe Graafian follicles were present in the ovary and ceased after ovulation. Oestrus was associated with increased activity of the uterine muscle which contracted rhythmically in its longitudinal fibres, both in body and horns. This activity began one or two days before, and reached its height with the onset of, oestrus. Contraction time varied from 10–80 seconds, becoming longer as oestrus developed. The circular muscle of the cervix was relaxed during uterine contraction and *vice versa.* The cervix opened during oestrus and remained open for some time after its cessation.

The ovarian and uterine activity described is stated to be due to a hormone [no details in abstract].

SCHOTT, R. G., & PHILLIPS, R. W. (1941). **Rate of Sperm Travel and Time of Ovulation in Sheep.**—*Anat. Rec.* **79.** 531–540.

Results indicate that the time required for sperm to traverse the genital tract in the ewe is somewhat less than that previously observed by other workers. A time interval of 20 min. was sufficient, in the majority of cases, for sperm to reach the upper part of the Fallopian tubes following normal service by the ram. The average length from posterior end of cervix to the upper end of Fallopian tubes was 80 cm., so that the rate of sperm travel in the genital tract of the ewe was approximately 4 cm. per min.; the rate of travel was found to be independent of the period in the oestrous cycle and of the time of ovulation. Ovulation in the majority of the cases examined occurred 20–36 hours after onset of oestrus. In Southdowns, oestrus tended to end after ovulation, whereas Corriedales and Dorset Downs continued in heat for a longer period, the average duration of oestrus in one group of Corriedales being 43 hours. Activity in the right and left ovaries was observed to be nearly equal for all the breeds examined.—N. J. S.

ANDERSON, J. (1942). **The Clinical Significance of the Hydrogen-ion Concentration of the Semen of the Bull.**—*Vet. Rec.* **54.** 317–318.

An alkaline reaction was characteristic of the semen of typical cases of epididymitis and of bulls with small testes. In cases of epididymitis only about 6% of the ejaculates had a lower pH than 7·0. In one of the bulls with atypical epididymitis whose semen was acid and whose spermatozoa showed high motility the spermatozoa counts were 530,000 and 770,000 per c.mm. The alkalinity of the semen in typical cases was associated with a decrease in the concentration or absence of spermatozoa. In three bulls with small testes, spermatozoa were absent from the ejaculates. In clinically normal, but proved sterile bulls, the spermatozoa were of low motility and the semen was either about the neutral point or alkaline. In all the sterile bulls the pH of successive ejaculates became increasingly alkaline.
—N. J. SCORGIE.

UNDERBJERG, G. K. L., DAVIS, H. P., & SPANGLER, R. E. (1942). **Effect of Diluters and Storage upon Fecundity of Bovine Semen.**—*J. Anim. Sci.* **1.** 149–154.

The dilution of fresh and stored bovine semen with egg-yolk-phosphate buffer solution and autoclaved milk did not result in a significant lowering of the conception

percentages from that of the undiluted semen. The stored semen, whole or diluted, showed a significantly lower conception percentage than fresh whole semen, despite the retention of a high degree of motility of the spermatozoa. It is concluded that the treatments had little beneficial effect on fertility. There is a brief discussion on hypothetical factors which may cause loss of fertilizing capacity of spermatozoa in storage, despite the retention of a high degree of motility.—N. J. S.

SALISBURY, G. W., WILLETT, E. L., & SELIGMAN, J. (1942). **The Effect of the Method of Making Semen Smears upon the Number of Morphologically Abnormal Spermatozoa.**—*J. Anim. Sci.* **1.** 199–205.

Data reported in this paper show that the method used in making semen smears gives rise to significant variation in the number of true abnormals, tail-less spermatozoa, and spermatozoa with coiled tails recorded at examination. In view of this variation it was difficult to understand why no difference was found between treatments in the proportion of spermatozoa with broken necks. It would appear that the most satisfactory method of preparation is that in which a drop of diluted semen is spread over a slide by placing another slide face down on it and pulling the two apart lengthways. The importance of a standard technique in the preparation of stained smears is emphasized, and also the necessity of examining more than one sample of semen when the proportion of morphologically abnormal spermatozoa alone is to be used as the criterion of fertility.—N. J. SCORGIE.

LASLEY, J. F., EASLEY, G. T., & MCKENZIE, F. F. (1942). **A Staining Method for the Differentiation of Live and Dead Spermatozoa. I. Application to the Staining of Ram Spermatozoa.**—*Anat. Rec.* **82.** 167–174.

A staining mixture composed of 1 part of 2% water-soluble eosin in M/8 phosphate buffer (pH 7·3) mixed with 1 part of a stain containing undiluted opal blue (1 part) and M/8 phosphate buffer of pH 7·4 (1 part) giving a final pH of 5·7, was found to stain dead sperm or sperm which had reached a state of irreversible inactivation, while live sperm remained unstained. By its use the relative number of live and dead spermatozoa in semen of the ram could be estimated. Preliminary observations indicate that this method of staining can also be applied to the semen of other animals, *viz*, the rabbit, boar, bull, and stallion.—R. ALLCROFT.

LANGLEY, L. L., & CLARKE, R. W. (1942). **The Reaction of the Adrenal Cortex to Low Atmospheric Pressure.**—*Yale J. Biol. Med.* **14.** 529–546. [Authors' conclusions copied *verbatim*].

Exposure of an animal to 20,000 feet altitude produces an activation of the adrenal cortex. This activation appears to be essential for adaptation to this environment. After acclimatization has occurred at this altitude, adrenal activity tends to return to normal. The adrenal cortex does not appear to be activated by decreased carbohydrate levels under these conditions. The observed carbohydrate alterations cannot be attributed solely to adrenal cortical activation. This does not mean to imply that the carbohydrate changes are unimportant, or without value to the organism in meeting the stress of the environment, but the rôle of the adrenal cortex in anoxia appears to be more intimately concerned with the disturbed acid-base balance resulting from hyperventilation.

GREENWOOD, A. W., & BLYTH, J. S. S. (1942). **Some Effects of Thyroid and Gonadotrophic Preparations in the Fowl.**—*Quart. J. exp. Physiol.* **31.** 175–185.

Extracts of horse, sheep, and pig pituitary, pregnant mare's serum (P.M.S.), and chorionic gonadotropin were administered to hens prior to and during the moulting period. Dried thyroid powder was fed during the non-productive phase.

Injections of P.M.S. to laying hens resulted in a cessation of egg production in five days, and the onset of a heavy moult. The combs increased in size during treatment. Apart from a slight increase in comb size in the group receiving pig pituitary extract, no reaction to the other gonadotropins was detected at the dosage level employed.

In non-laying hens, pig pituitary appeared to cause a temporary reactivation of the reproductive organs, but in no case did ovulation occur. P.M.S. had little effect on non-laying hens and the other gonadotropins were again inactive.

The administration of thyroid caused consistent symptoms of ovarian stimulation and a number of birds resumed egg production. Variations in the response appeared to be related to the media in which the hormone powder was fed.—F. AYLWARD.

KOSTNER, M. (1940). Ovarialhormon zur Verhinderung der Gravidität bei der Hündin. **[Inhibition of Pregnancy in the Bitch by Ovarian Hormone].**—*Wien. tierärztl. Mschr.* **27.** 465–471.

The results of a number of experiments on pregnant bitches indicated that subcutaneous or intramuscular injections of folliculin (as "Follikulin-Menformon") destroy the physiological action of the corpora lutea; the hormone was given to the animals in doses of 60,000 to 240,000 M.U. 5–7 days after coitus with an interval of one day before the next injection. K. shows that this treatment so alters the endometrium that implantation of the fertilized egg is prevented. This method of interrupting pregnancy has no lasting or harmful effects on the animal's health. "Stilboral" (5–10 mg. injected three times) or sexocretin (2–4 ml. given three times) also gave positive results in large animals.—E. R. PARISER.

NAKATANI, M., & OHARA, Y. (1939). Ueber die östrogene Wirkung von Extrakt aus der Haut der getrockneten kleinen Fische. **[Oestrogenic Action of Extract from the Skin of Dried Fishes].**—*Trans. Soc. path. japon.* **29.** 573–577. [In German].

Injection of extracts of the skin, muscle tissue, and viscera of fishes into castrated mice showed that oestrogenic substances were present only in richly pigmented fish skins, *e.g.* sardines etc. It was also found that oestrogenic substances were formed only on exposure of the skin to the sun.—E. R. PARISER.

ROBSON, J. M., SCHÖNBERG, A., & TADROS, W. (1942). **A New Synthetic Oestrogen with Prolonged Action when Given Orally. [Correspondence].**—*Nature, Lond.* **150.** 22–23.

The activity of a number of synthetic oestrogens was determined on groups of ovariectomized mice by quantitative methods. The authors have obtained a substance, $\alpha\alpha$-di-(p-ethoxyphenyl)β-phenyl bromoethylene [D.B.E.], which has an oral threshold similar to that of oestradiol and much higher than that of stilboestrol. Unlike these substances, however, a relatively small increase in the oral dose of D.B.E. produced an appreciable increase in the duration of its action. The question of the possible site in the body where D.B.E. may be stored and also the clinical value of the substance are being investigated. Given subcutaneously, D.B.E. has a relatively high threshold, but a small increase in the dose produces a very marked prolongation in the duration of its action. In this respect it is similar to the di-esters of oestradiol.—N. J. SCORGIE.

CAMPBELL, N. R., & CHATTAWAY, F. W. (1942). **Molecular Structure in Relation to Oestrogenic**

Activity: Polynuclear Analogues of γ: δ-di-(4-hydroxyphenyl)-*n*-hexane ('hexoestrol').—*Proc. roy. Soc.* Ser. B. **130.** 435–447.

A number of compounds related to hexoestrol have been prepared and their oestrogenic activity determined. The 4-hydroxyphenyl group seems essential for maximum activity of the "hexoestrol" type of compound. There is some evidence that the introduction of a methyl group in the benzene ring will lower the oestrogenic activity.—J. M. ROBSON.

WHITE, A., BONSNES, R. W., & LONG, C. N. H. (1942). **Prolactin.**—*J. biol. Chem.* **143.** 447–464.

From a highly purified amorphous preparation of prolactin obtained from beef pituitary gland, a crystalline prolactin has been obtained with lactogenic activity very similar to that of the amorphous product. The crystals appear to be protein in nature; the homogeneity of the material has been studied by electrophoresis, ultracentifugation, and solubility measurements.—F. AYLWARD.

LAMBERT, W. V., & MCKENZIE, F. F. (1940). **Artificial Insemination in Livestock Breeding.**—*Circ. U.S. Dep. Agric.* No. 567. pp. 67.

This publication is a valuable compilation of the available knowledge of the techniques of artificial insemination in the larger domestic animals, dogs, foxes, rabbits, and poultry. Excellent descriptions are given of the various procedures involved, together with many illustrations and tables. Most of the literature on artificial insemination is discussed up to 1939, 76 references being given. The subject matter is not suitable for abstraction and the original should be consulted for specific information.—N. J. SCORGIE.

SCHLOTTHAUER, C. F., & BOLLMAN, J. L. (1942). **The Effect of Artificial Cryptorchidism on the Prostate Gland of Dogs.**—*Amer. J. vet. Res.* **3.** 202–206.

Surgical transplantation of one testis to the abdominal cavity, with or without removal of the other testis, did not cause atrophy of the prostate in adult dogs. Degenerative changes in the transplanted testis involved only the tubular cells; no changes of the interstitial tissue were observed even after 798 days. Bilateral castration caused retrogressive changes and atrophy of the prostate. The authors conclude that the interstitial cells of the testis, even when placed in the abdomen, secrete sufficient male hormone to maintain the prostate gland in normal condition.—N. J. SCORGIE.

FRANKLIN, K. J., AMOROSO, E. C., BARCLAY, A. E., & PRICHARD, M. M. L. (1942). **The Valve of the Foramen Ovale and its Relation to Pulmonary Vein Entries.**—*Vet. J.* **98.** 29–41.

In the foetal heart the left terminal division of the posterior vena cava (*i.e.* the foramen ovale) enters the left atrium immediately below, and by means of a large common opening with, the pulmonary veins draining the anterior part of the right lung. At birth the increase in calibre, associated with activity of the lung, can only be achieved at the expense of a decrease in calibre of the foramen ovale and its valve, consequently the foramen closes. Details of lung lobation and suggested new functional terms for some parts of the foetal cardiovascular system are also described.—C. W. OTTAWAY.

ST. CLAIR, L. E. (1942). **The Nerve Supply to the Bovine Mammary Gland.**—*Amer. J. vet. Res.* **3.** 10–16.

The bovine udder is innervated by spinal and sympathetic fibres. The chief spinal nerves are the first and second lumbar, which supply the anterior part of the fore quarters, the inguinal nerve (chief supply), which is distributed to all quarters, and to the supramammary lymph node, and the perineal nerve, which passes over the ischial arch to supply the posterior part of the hind quarters. The skin and subcutaneous tissue have a richer nerve supply than the glandular tissue. The sympathetic fibres run in rami to the lumbosacral plexus and are conveyed to the udder along with the spinal nerves, where they contact the vessels and are distributed with them. They are vaso-constrictors and motor to the smooth muscle. It was found that their effect on milk-letting was not as great as that of hormonal control. Paravertebral anaesthesia was satisfactory for teat and udder operations.—C. W. OTTAWAY.

POISONS AND POISONING

GABEL, W. (1941). Neue Untersuchungen über die Bleivergiftung bei Tieren. [**New Observations on Lead Poisoning in Animals**].—*Dtsch. tierärztl. Wschr.* **49.** 6–9.

Experimental lead poisoning was induced in two horses, one ox, and a series of rabbits; no correlation could be found between the excretion of porphyrins, the amount of lead ingested, or the appearance of clinical symptoms. Ether-soluble porphyrins in normal urine were found to be 6 μg. per 100 ml. for horses, 3 μg. for rabbits, and a mere trace for cattle.

Records of 126 animals passing through the Hanover veterinary school in the years 1930–39, showed that the frequency of lead poisoning rose in summer, fell in autumn, climbed sharply in November, and fell again throughout the winter. The amount of lead found in the liver rose in summer, fell in autumn, and thereafter remained inversely related to the occurrence of clinical symptoms. The maximum average lead content of livers was 0·72 mg. % in June and 0·24 mg. % in October. The highest number (20) of clinical cases occurred in November and lowest number (5) in April.

G. believes that cases occurring in spring and early summer are acute and due to inhalation of dust or ingestion of lead with grass. In autumn most of the clinical cases are chronic, believed to be associated with stall feeding and release of lead previously stored in the liver. [Lead in dust or grass is due to industrial contamination: the above cases all came from the Harz region.]—ALEX. B. PATERSON.

*HARBITZ, F. (1941). [**Poisoning of Cattle by Inhalation of Mercury Vapour**].—*Norsk VetTidsskr.* **53.** 363–377. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 217].

After the treatment of a cow with mastitis by a large amount of mercury ointment, many other cattle in the same shed became affected with cough, nasal discharge, fever, emaciation, dermatosis, and bleeding of the oral mucosa. Eight of them died and parenchymatous degeneration with haemorrhage of the liver, kidneys, and myocardium and acute gastro-enteritis were found P.M.

WEBER, C. (1942). Tierverluste durch Erkrankungen beim Versand in Düngerwagen. [**Losses in Animals Transported in Wagons Previously Loaded with Artificial Nitrogenous Fertilizers**].—*Berl. Münch. tierärztl. Wschr.* May 1st. 139–140.

Losses among animals sent by rail in trucks previously used for artificial fertilizers or other chemicals

have led to the passing of legislation making it obligatory for such trucks to be cleaned before being used for animals. W. gives a brief account of three reports of deaths among pigs occurring under these conditions and reported to the authorities in Germany during the year preceding the new legislation. In all three instances the trucks were contaminated by nitrogenous fertilizers and in two the toxic substance was calcium cyanamide. The symptoms and P.M. lesions are described. It is of interest to note that calves which were sent with the pigs showed no symptoms and there were no fatalities among them.—E. G. WHITE.

OVERMAN, R. S., STAHMANN, M. A., SULLIVAN, W. R., HUEBNER, C. F., CAMPBELL, H. A., & LINK, K. P. (1942). **Studies on the Hemorrhagic Sweet Clover Disease. VII. The Effect of 3,3′-Methylenebis (4-Hydroxycoumarin) on the Prothrombin Time of the Plasma of Various Animals.**—*J. biol. Chem.* **142.** 941–955. [For previous parts, see *V. B.* **12.** 240. Part VIII not yet published].

OVERMAN, R. S., FIELD, J. B., BAUMANN, C. A., & LINK, K. P. (1942). **Studies on the Hemorrhagic Sweet Clover Disease. IX. The Effect of Diet and Vitamin K on the Hypoprothrombinemia Induced by 3,3′-Methylenebis (4-Hydroxycoumarin) in the Rat.**—*J. Nutrit.* **23.** 589–602.

VII. The response of susceptible rabbits to the feeding of 3,3′-methylenebis (4 - hydroxycoumarin) in doses of 0·37–6·0 mg. showed that the resultant increase in clotting time, *i.e.* the extent of the hypoprothrombinaemia, and the period required for the restoration of normal clotting values, are proportional to the doses given. The effect on the prothrombin time of feeding single doses to rats, g. pigs, and dogs is given. It is shown that rabbits classified as resistant to 3,3′-methylenebis (4-hydroxycoumarin) after oral feeding, can develop hypoprothrombinaemia when the substance is injected intravenously or fed in very large doses. The great variation in individual rabbits in their response to oral administration of 3,3′-methylenebis (4-hydroxycoumarin) appears to be partly associated with a variation in ability to absorb the substance. In contrast to the rabbit, no indications of relative resistance to the prothrombin-inactivating properties of 3,3′-methylenebis (4-hydroxycoumarin) have been observed in rats, g. pigs and dogs.

The clotting time of progressively diluted normal plasma and similarly diluted plasma obtained after the administration of 3,3′-methylenebis (4-hydroxycoumarin) is discussed in relation to the extent of prothrombin depletion.

It is also shown that hypoprothrombinaemia can be produced by some of the analogues and derivatives of 3,3′-methylenebis (4-hydroxycoumarin).

IX. Investigations on 260 adult rats showed that a single oral dose of 2·5 mg. of 3,3′-methylenebis (4-hydroxycoumarin) lowered the prothrombin activity of the blood to a maximum of 22% of normal in 24 hours. The substance was most effective when the rats were maintained on an artificial ration deficient in vitamin K, but when fed basal rations containing grain, fish meal, and alfalfa respectively the hypoprothrombinemia produced was much less severe. Administration of vitamin K markedly decreased the extent and duration of the hypoprothrombinemia produced by 3,3′-methylenebis (4-hydroxycoumarin), but complete protection was obtained only after administration of an enormous dose (25 mg.) of the vitamin. Forms of vitamin K other than 2-methyl 1,4-naphthoquinone also counteracted the effects of the haemorrhagic substance. Continued administration of an average of 2 mg. of 3,3′-methylenebis (4-hydroxycoumarin) resulted in the death of the rats on the artificial diet deficient in K within about 14 days. Their survival times could be prolonged by the ingestion of vitamin K, but supplements such as choline, ascorbic acid, wheat germ oil, hydrogenated fat, or condensed milk had no effect.

—R. ALLCROFT.

I. ROSE, C. L., HARRIS, P. N., & CHEN, K. K. (1942). **Toxicity of 3,3′-Methylenebis (4-hydroxycoumarin).** —*Proc. Soc. exp. Biol., N.Y.* **50.** 228–232.

II. RICHARDS, R. K., & CORTELL, R. (1942). **Studies on the Anticoagulant 3,3′-Methylene-Bis-(4-Hydroxycoumarin).**—*Ibid.* 237–242.

I. Intravenous and oral medium lethal doses of 3,3′-methylenebis (4-hydroxycoumarin) as "Dicumarol" were determined for mice, rats, and g. pigs. The effect of prolonged oral administration of dicumarol was observed in dogs, mice, and rats and death occurred after daily doses of 5–50 mg. per kg. for dogs and 0·01–1% in food for mice and rats. Death occurred in rabbits after intravenous injection of daily doses of 1–2 mg. per kg.: most rabbits tolerated 0·1–0·5 mg. per kg. for six weeks. These results demonstrate the toxicity of dicumarol, and, as in the "sweet clover disease" of cattle, haemorrhage into the tissues and organs and pulmonary oedema were the chief P.M. findings; central necrosis of the liver was observed in about half the rats examined and occasionally in rabbits, mice, and dogs.

II. Histological examination of the radial and saphenous veins of dogs showed that oral administration of 10–25 mg. dicumarol for 3–5 days greatly reduced the incidence of thrombus formation, induced by injection of ethanolamine oleate, as compared with controls not given dicumarol. The pathology of the liver was studied on two dogs given 10–25 mg. dicumarol for ten days and two monkeys given 5 and 10 mg. per kg. daily for eight and ten days. One of each species showed some signs of necrosis of the liver, but marked internal haemorrhage and advanced anaemia were the most significant P.M. findings. Intravenous glucose tolerance tests and bromsulphalein retention tests failed to show liver damage in two dogs given dicumarol but not suffering from bleeding. The livers of g. pigs given 25 mg. dicumarol every second day until death, showed a tendency to fatty infiltration and degeneration and a few foci of early necrosis. These changes are similar to those which occur in vitamin C depleted animals, and one group of g. pigs on a C free diet died earlier than others after administration of dicumarol. This suggests a connexion between vitamin C level and sensitivity to dicumarol.—R. ALLCROFT.

MOZGOV, I. E., DANILOVA, A. K., AKULOV, A. V., & BUKHAROV, I. I. (1941). Opyt skarmlivaniya khlopchatnikovogo zhmykha krupnomu rogatomu skotu i svin'yam. [**Gossypol Poisoning of Cattle and Swine after Feeding Cottonseed Cake**].—*Veterinariya, Moscow.* No. 2. pp. 110–113. [French summary].

It was shown that cottonseed cake containing active gossypol is poisonous for animals. To investigate the effect of the poison, pigs and cattle were fed on cottonseed cake containing, amongst other substances:—0·16–0·18% gossypol, 8·30–8·43% water, 5·86–6·04% ash, 5·9–6·23% total N, and 36·9–39·9% protein. The toxic action of the cake is characterized by the development of gastro-enteritis with haemorrhages in the stomach and intestine. Inflammatory processes occur in the liver, kidneys, spleen, and lymph nodes. Slight poisoning can be discovered only by blood analyses and by the lesions found P.M. The cake can be made harmless for animals by converting the active

gossypol into an inactive form by heating the cake at 100°C. for one hour or at 70°C. for two hours. If the cottonseed cake is not subjected to this treatment, the product should be used as a fodder only for a short time and in small quantities. Cattle should not receive more than 3 kg. and pigs not more than 500 g.—E. R. PARISER.

BAGCHI, R. B. K. N., & GANGULY, H. D. (1941). **Cattle Poisoning by** *Sorghum vulgare.—Indian vet. J.* **18.** 151–154.

The authors analysed different parts of *S. vulgare* plants at various stages of growth. The maximum amount of HCN was found in the sprouts 72 hours after germination, when the plant was about 1 in. in length. After this stage the amount of HCN decreased continuously to a trace or to nil when the plant was fully grown. Stunted plants contained more HCN.

In developing the technique for estimating HCN, they found that if the plant material is subjected to extraction immediately after crushing none, or only a trace of, HCN is detected. But if after crushing it is soaked in water for 2–4 hours at room temperature (summer) the maximum yield is obtained. Soaking for 24 hours reduces the yield.

Mineral acids and alkalies in concentrations higher than N/40 were found to retard the hydrolysis, and a tentative approach to the treatment of HCN poisoning on the basis of this observation is suggested. Since the HCl content of the abomasum is very low and the reaction in the other compartments of the stomach of healthy and fasting animals is neutral or slightly alkaline, it appears that the compartments other than the true stomach offer ideal conditions for rapid hydolysis and the production of maximum amount of HCN. As retention of food in the stomach of ruminants is fairly long, they assume that timely administration of a suitable dose of sodium carbonate may prevent the production of HCN in the alimentary tract and avert all danger.—N. D. KEHAR.

GUSYNIN, I. A. (1941). O toksikologicheskom znachenii gorchaka (Acroptilon picris SAM) po opytam na krupnykh zhivotnykh. [**Toxicological Importance of** *A. picris.* (**Water Pepper, Biting Snake-weed**)].—*Veterinariya, Moscow.* No. 2. pp. 114–117.

The literature on the subject is discussed and an account given of the occurrence of the weed, *A. picris.* A number of experiments is described in which fresh, dry plants, and seeds from different districts were fed to stallions and mares. No symptoms were observed to support the view that the weed is poisonous for horses.—E. R. PARISER.

STILES, G. W. (1942). **Poisoning of Turkey Poults from Whorled Milkweed** (*Asclepias galioides*).—*Poult. Sci.* **21.** 263–270.

Deaths occurring amongst turkey poults newly put out on range were attributed to poisoning by the whorled milkweed. Symptoms developed about one hour after the birds had eaten the plant. In acute cases they consisted of listlessness and incoordination followed by convulsions and prostration, during which the birds lay on their sides or backs with wings flapping and making trembling or running movements with the legs. Before death the birds became exhausted and comatose.

Feeding experiments were carried out in which whorled milkweed was fed to poults and chickens. Poults fed 1 g. of milkweed per 100 g. body weight developed spasms within one hour and usually died. Immature plants appeared to be more toxic than the mature ones.

Chickens appeared to be less susceptible than poults to the toxic principle.—F. D. ASPLIN.

*QUITTEK, G. (1940). Der Erbsenkäfer (Bruchus pisorum L.) als Ursache von Gesundheitsstörungen bei Tauben. [**Haemorrhagic Enteritis in Pigeons due to Eating Peas Infested with** *Bruchus pisorum* (**Pea Beetle**)].—*Dtsch. tierärztl. Wschr.* 208–209. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **138.** 396].

A description of disease and deaths in pigeons fed on peas infested by the pea beetle, *B. pisorum.* The latter were incriminated by the feeding of two pigeons with infested peas, which caused fatal haemorrhagic enteritis. The mechanism of this action, whether mechanical or toxic, was not determined.

TEAGUE, R. S. (1942). **Toxicology of the Synthetic Estrogen Diethylstilbestrol and Certain Related Compounds.**—*J. Pharmacol.* **75.** 145–153.

Large daily doses of synthetic oestrogens were found to cause depression of growth in rats. The duration of administration varied from 10–86 days. Diethylstilboestrol was shown to produce disturbances in the normal blood picture and to cause weight changes in various internal organs. All the oestrogens studied caused characteristic changes in the liver which were shown to be due to the deposition of glycogen in the hepatic cells.—N. J. SCORGIE.

WARREN, M. R., BECKER, T. J., MARSH, D. G., & SHELTON, R. S. (1942). **Pharmacological and Toxicological Studies on Cetylpyridinium Chloride, a New Germicide.**—*J. Pharmacol.* **74.** 401–408.

The M.L.D. in rabbits following intravenous administration was 20 mg. per kg. Following oral administration, the compound in an amount of 400 mg. per kg. killed one out of six rabbits. The compound was most toxic following intraperitoneal administration (5 mg. per kg.). In many cases death was delayed for 3–6 days. Toxic effects included an action on the cardiovascular system and a "curare-like" action similar to that produced by quaternary ammonium bases. The irritant action of the compound in the skin or mucous membranes was slight.—J. M. ROBSON.

GRANT, J., & RITCHIE, T. F. (1942). **Mustard-Gas Burns.**—*Brit. med. J.* Aug. 22nd. 217–218.

A report is given of ten cases (human) of mustard-gas burns sustained as the result of an accident during an A.R.P. demonstration. All were entirely unaware of any contact with liquid mustard gas which fell in the form of fine droplets and the length of the latent period varied from 1½–50 hours. Attention is again drawn to the insidious action of mustard gas.—R. ALLCROFT.

THERAPEUTICS

I. HOBBY, G. L., MEYER, K., & CHAFFEE, E. (1942). **Activity of Penicillin** *in vitro.—Proc. Soc. exp. Biol., N.Y.* **50.** 277–280.

II. HOBBY, G. L., MEYER, K., & CHAFFEE, E. (1942). **Observations on the Mechanism of Action of Penicillin.**—*Ibid.* 281–285.

III. HOBBY, G. L., MEYER, K., & CHAFFEE, E. (1942). **Chemotherapeutic Activity of Penicillin.**—*Ibid.* 285–288.

I. Details are given of the method used for culture of *Penicillium notatum* by which a maximum titre of penicillin was obtained in eight days. Preparations of the ammonium salt were obtained with an activity of 0·03–0·1 μg. per ml. against a standard strain of haemolytic streptococci; crystalline preparations were also obtained with an activity of 0·03 μg. per ml. The *in vitro* activity was tested against a wide variety of organisms, the results confirming the work of FLOREY *et al.*

[see *V. B.* **12.** R1–R6 and 511]. The antibacterial effect was greatest against Gram-positive organisms although two strains of staphylococci were found to be resistant.

II. Studies on the rate of killing with penicillin showed that the number of organisms decreased at a constant rate until 99% of the organisms were destroyed. With the last 1%, either the number continued to decrease at the same rate until complete sterilization was effected, or the number decreased at a somewhat slower rate, or the number increased. This indicates that penicillin may act either as a bacteriostatic or bactericidal agent depending on the experimental conditions. This is in sharp contrast to the action of the sulphonamides which are only bacteriostatic, but is comparable to the effect of gramicidin and tyrocidin, although penicillin acts more slowly than the last two substances. The action of penicillin on haemolytic streptococci was not accompanied by lysis of the organisms. Absorption studies showed that no detectable amount of penicillin was destroyed or absorbed from solution by the organisms. The effect of the growth phase of organisms on the activity of penicillin was investigated and the results indicate that the substance is capable of destroying bacteria only when active multiplication takes place.

III. The *in vivo* activity of penicillin was demonstrated in mice when used subcutaneously, intraperitoneally, or intravenously; 1·5 mg. penicillin protected mice against 1 ml. of whole culture of haemolytic streptococci containing at least 1,000,000 lethal doses. Treatment was effective if started as long as eight hours after infection. Penicillin is rapidly excreted when injected in solution, but a single subcutaneous injection of 3·0 mg. penicillin in an oil suspension, or implantation of a single pellet containing 1·5–3 mg. protected 66% of mice against 1,000 lethal doses of haemolytic streptococci. Toxicity trials showed that penicillin is not toxic within the range of therapeutic dosage.—R. ALLCROFT.

I. ABRAHAM, E. P., CHAIN, E., & HOLIDAY, E. R. (1942). **Purification and Some Physical and Chemical Properties of Penicillin. With a Note on the Spectrographic Examination of Penicillin Preparations.**—*Brit. J. exp. Path.* **23.** 103–119.

II. FLOREY, H. W., & JENNINGS, M. A. (1942). **Some Biological Properties of Highly Purified Penicillin.** *Ibid.* 120–123.

I. Details are given of a method for obtaining a highly purified preparation of penicillin by means of distribution between solvents, absorption of impurities by charcoal, chromatographic separation, reduction by aluminium-mercury couple followed by further chromatographic adsorption. The barium salt thus obtained has an activity of 450–500 units per mg. Electrometric titration and the results of the elementary analysis suggest a formula such as $C_{24}H_{32}O_{10}N_2B_a$. A study of some of the physical and chemical properties of penicillin showed that it was very sensitive to oxidizing agents and less sensitive to reducing agents, and unstable towards dilute acid and alkali, heat, primary alcohols and various heavy metals.

In an addendum H. records the results of spectrographic examination of the barium salt of penicillin in various stages of purification, and of the spectra resulting from the actions of acid, alkali, and reducing substances on this salt. From absorption data there was no evidence that the limit of purity has been reached.

II. As penicillin can now be obtained in a much purer state than previously [see *V. B.* **12.** R1–R6.] the authors reinvestigated its antibacterial activity. The purest penicillin product so far obtained completely inhibited the growth of staphylococci at a dilution of between 1 in 24 million and 1 in 30 million; partial inhibition was observed up to 1 in 160 million. Trials on the comparative sensitivity of a number of organisms to a less pure product showed that a number of strains of sulphonamide-resistant streptococci were inhibited and that two salmonella organisms were fairly sensitive. Toxicity trials showed that intravenous injection of 20 mg. of the sodium salt had no effect on 20 g. mice, and that human leucocytes survived for an hour in a 1% solution. Methods of assay and the standard of activity of penicillin are briefly discussed.—R. A.

I. WAKSMAN, S. A., & TISHLER, M. (1942). **The Chemical Nature of Actinomycin, an Antimicrobial Substance Produced by Actinomyces antibioticus.**—*J. biol. Chem.* **142.** 519–528.

II. GARDNER, A. D., & CHAIN, E. (1942). **Proactinomycin: A "Bacteriostatic" Produced by a Species of Proactinomyces.**—*Brit. J. exp. Path.* **23.** 123–127.

I. A study of the chemical properties of actinomycin A indicates that it is a polycyclic nitrogen compound containing 59% C, 6·8% H, 13·35% N and 20·8% O, and has one or more functional groups capable of reversible reduction-oxidation, probably quinone in nature, and several others capable of acetylation. It is optically active and has a molecular weight of about 800. Its bacteriostatic and bactericidal activity varies with the nature of the organism, being effective in concentrations of 1 : 100,000,000 against certain Gram-positive bacteria, but as has already been shown, it is highly toxic to animals [see *V. B.* **12.** 243].

II. A description is given of a bacteriostatic substance obtained from a fungus provisionally identified as a species of proactinomyces; the morphology, cultivation, and biochemical reactions of the organism are given. The antibacterial agent has basic properties and can be extracted from the culture fluid by various organic solvents such as ether, amyl acetate, benzene, and carbon tetrachloride. It can be re-extracted by water from the organic solvent, concentrated *in vacuo*, and evaporated to dryness from the frozen state, yielding a white powder readily soluble in water. Investigation of the bacteriostatic activity of the preparation showed that it was effective in a dilution of 1 : 1,500,000 against *Streptococcus pneumoniae* (types 13 and 22); 1 : 500,000 against *Str. pyogenes* (group A), *Staphylococcus aureus*, *Neisseria meningitidis* (group I) and *Bacillus anthracis*; 1 : 6,000 against *Vibrio cholerae*; and 1 : 2,000 against *Salmonella typhi*, *S. paratyphi B*, *Bacterium coli*, and *Bact. shigae*. Toxicity tests on mice showed that intravenous or intraperitoneal injection of 1 mg. caused no visible ill effects, but high quantities were toxic; a dilution of 1 : 30,000 had no effects on the movements of leucocytes, but a 1 : 3,000 solution caused death in an hour. Like penicillin its activity is primarily against Gram-positive organisms and the Neisseriae, but it is more toxic although more stable than penicillin. Preliminary investigations on the bacteriostatic activity of other species of *Actinomyces* are included.—R. A.

LUM, E. A. (1942). **Diffusion of Sulphanilamide, Acriflavine and Gentian Violet.**—*Lancet.* **242.** 585–586.

The rate of diffusion of sulphanilamide through agar gel laboratory models of body tissue is greater than that of either acriflavine or gentian violet. Fixation of acriflavine and gentian violet by dead body tissues greatly restricts the diffusion of these substances. The fixation does not result in loss of antiseptic power and bacteria are unable to grow on nutrient agar on which acriflavine or gentian violet has become fixed.—J. M. R.

MACARTNEY, D. W., LUXTON, R. W., SMITH, G. S., & RAMSAY, W. A. (1942). **Sulphamethazine. Clinical**

Trials of a New Sulphonamide.—*Lancet.* **242.** 639–641.

The drug (2-(4′-amino-benzene-sulphanilamino) 4 : 6-dimethylpyrimidine) is related to sulphadiazine and has been prepared by Imperial Chemical (Pharmaceuticals) Ltd. It has been tried in 73 cases of lobar pneumonia and a few cases of meningococcal meningitis and gonorrhoea. The preliminary results suggest that the preparation has a high therapeutic efficiency and on account of its high solubility (297 mg. % at pH 7·5) is unlikely to cause renal damage. The incidence of nausea and vomiting is much less than with sulphapyridine, and cyanosis is absent.—J. M. Robson.

Powell, H. M., Krahl, M. E., & Clowes, G. H. A. (1942). **Inhibition of Chemotherapeutic Action of Sulfapyridine by Local Anesthetics.**—*J. Ind. med. Ass.* **35.** 62–63.

A demonstrable inhibition of the chemotherapeutic action of sulphapyridine in mice infected with pneumococci has been produced by certain local anaesthetics derived from *p*-aminobenzoic acid, but not by certain other local anaesthetics not derived from *p*-aminobenzoic acid.—J. M. Robson.

Thorp, W. T. S., & Shigley, J. F. (1942). **Sulfaguanidine Therapy for Calf Scours.**—*Vet. Med.* **37.** 210–213.

Sulphaguanidine was fairly successfully used in 39 of 40 cases of calves showing typical symptoms of calf scours. The doses recommended are as follows :– for calves of 75 lb. and over, 0·15–0·17 g. per lb. body weight per day, divided into three equal parts and given morning, noon, and night ; for calves under 75 lb., 0·13 g. per lb. body weight administered in the same manner. The dosage for all calves should be reduced on the third day by 0·05 g. per lb. body weight, and not more than 0·06 g. per lb. should be given on the fourth day. Three calves which were given three times the therapeutic dose died from severe tubular nephritis.—D. G. Davey.

*Aschan, A. (1941). Das Sulfanilamid in der Praxis. [**Sulphanilamide in Veterinary Practice**].—*Suom. Eläinlääkäril.* **445.** [Abst. from abst. in *Skand. Vet-Tidskr.* **32.** 59].

The author treated seven cases of foal-ill (navel-ill) with a proprietary sulphanilamide preparation called " Strepto-Lysin Orion ". Six patients recovered within a week and the seventh later.—G. B. Brook.

Schalm, O. W. (1942). **The Treatment of Chronic Bovine Mastitis.**—*J. Amer. vet. med. Ass.* **100.** 323–334.

An account is given of the chemotherapeutic materials and methods used in five herds for the eradication of *Streptococcus agalactiae* infection from the bovine udder. The agents used were entozon, gramicidin (tyrothricin), trypaflavine, acriflavine, neutral acriflavine in 20% sucrose solution, and novoxil (colloidal silver oxide). 83·5% of 345 infected quarters were freed from infection, representing 74% of infected cows. The number and percentage of quarters cured by the various chemotherapeutic agents were as follows :– 55 (90%) of 61 quarters by entozon, 73 (82%) of 89 quarters by tyrothricin, 25 (73·5%) of 34 quarters by novoxil, 106 (58·6%) of 181 quarters by sugar-acriflavine, and 20 (48·7%) of 41 quarters by acriflavine 1 : 10,000. The udder is most successfully and economically treated when nonlactating ; it is considered that tyrothricin was the most effective of the agents used in the treatment of lactating udders, but it was potentially the most irritating, therefore the dosage must be carefully adjusted to the activity of the udder and the severity of the inflammation.

Infections with *Str. uberis* or *Str. dysgalactiae* responded to treatment at least as well as those due to *Str. agalactiae*, but staphylococcal udder infections were comparatively resistant to chemotherapy.—E. C.

Cockburn, H. S. (1942). **The Treatment of Mastitis by Irrigating the Udder with a Solution of Proflavine Sulphate, combined with the use of a Mixed Vaccine.**—*Vet. Rec.* **54.** 204–205.

The results are tabulated of treating 39 cows affected with catarrhal mastitis. Treatment in the majority consisted of two irrigations at an interval of about a week with a solution of 1 : 7,500 proflavine sulphate ; mixed mastitis vaccine was given subcutaneously. Of the 39 cows treated, 28 made a clinical recovery in 1–3 weeks, and of the 71 quarters treated 49 recovered, the recovery rate being 71·8% of the cows and 69·0% of the quarters treated.—J. A. Griffiths.

Bryan, C. S., Darby, C. W., Mallmann, W. L., & Corbett, A. C. (1942). **The Role of Disinfectants in the Control of Mastitis.**—*J. Milk Technol.* **5.** 77–85.

In vitro tests on 11 strains of mastitis streptococci and a few of *Bacterium coli* and *Staphylococcus aureus* showed that soap solutions prepared from several popular proprietary brands of soap were ineffective as disinfectants, even though used in greater concentration than by McCulloch [*V. B.* **12.** 474.], who reported that the soaps were effective. Sulphonated alcohol in the form of " Drene " was also found ineffective.

On the other hand, hypochlorite was very effective in a concentration of 1 p.p.m. Cl. against α, β and γ streptococci *in vitro* and at 200 p.p.m. Cl as an udder disinfectant, if used as a freshly prepared solution.—J. E.

Wirth, D. (1942). Behandlung der Drusenmetastase in den vorderen Gekröswurzellymphknoten. [**Treatment of Strangles Metastases in the Anterior Mesenteric Lymph Nodes**].—*Wien. tierärztl. Mschr.* **29.** 81–86.

An account of the treatment of five cases of strangles with abdominal metastases. All horses were given ½ oz. of Lugol's iodine solution and a sulphonamide. Details are given of the treatment applied. The horses recovered.—O. D. James.

Sulkin, S. E., Douglass, D. D., & Bronfenbrenner, J. (1942). **Bacteriophage Therapy. IV. Effect of Bacteriophage in Experimental Staphylococcal Septicemia in Rabbits.**—*J. infect. Dis.* **70.** 92–95. [For previous parts, see *V. B.* **11.** 60].

Attempted phage therapy was found to exert no significant influence on the extent or persistence of experimental staphylococcal septicaemia in rabbits. Phage propagated on a highly invasive staphylococcus (presumably containing spreading factor), and autolysate (Reynal's spreading factor) prepared from the same culture, shortened the survival time of experimental animals as compared with controls, which were injected with staphylococci alone. These results do not support the clinical reports of the effectiveness of bacteriophage therapy in staphylococcal septicaemia, but suggest that certain preparations of bacteriophage may exert an unfavourable effect. It is suggested that these unfavourable effects may be due to the presence of spreading factor in certain of the phage lysates, but it does not necessarily follow that phage free from spreading factor will give favourable clinical results.—I. W. Burton.

*Marginesu, P., & Sircana, A. (1941). Ricerche sull'azione dei sulfamidici sui bacilli del carbonchio " in vitro " ed " in vivo ". [**Action of Sulphonamides on Anthrax Bacilli *in vitro* and *in vivo***].—*Igiene mod.* **34.** 33–44. [Abst. from abst. in *Zbl. Bakt. I. (Ref.).* **140.** 337].

The preparation used produced no bacteriostatic or bactericidal action on anthrax bacilli grown on broth. When the bacilli were grown on ox serum, inactivated and treated with glucose, the sulphonamide produced some bacteriostatic action and some effect on the capsules. The administration of the sulphonamide together with anthrax bacilli in broth did not beneficially influence the course of the infection.—J. M. ROBSON.

*SHPANIR, F. L., CHERTKOVA, E. I., & SEREBRENNIKOVA, L. I. (1940). **[Chemotherapy with Azo Dyes of Experimental TB. in Rabbits].**—*Probl. Tuberk.* No. 10. pp. 3–4. [In Russian]. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 354].

The specific affinity between tubercle bacilli and certain azo-dyes recorded by HESSE & MEISSNER was not confirmed. Little or no check to the spread of the disease was produced by rectal administration of azo-dye to tuberculous rabbits for two months or longer. [The particular dye used was not specified in abstract.]
—J. LOCHIEL MCGIRR.

ROPERT, J. (1942). **The Treatment of Actinobacillosis by Intravenous Injection of Sodium Iodide.**—*Aust. vet. J.* **18.** 35–37.

Two cows, one with early and the other with advanced actinobacillosis of the throat region, were given two and three doses respectively of 30 g. sodium iodide in 550 ml. of water at 18-day intervals.

The first injection arrested growth of the lesion, and subsequent injections resulted in complete resolution, without any harmful effects to the animals [see also PULLAR—*V. B.* **10.** 874.]—A. W. BANKS.

*D'ANGELA, C. (1940). La linfangite criptococcica in A. O. ed i vari metodi di cura sperimentali. **[Epizootic Lymphangitis in Italian East Africa; Chemotherapy Experiments].**—*Riv. milit. Med. vet., Roma.* **3.** 327–330. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 297].

Of 500 horses and mules affected with epizootic lymphangitis, 350 were treated surgically, and 96% of these recovered. Fifty other cases were each given 7–14 intravenous injections of 10 ml. of a 1% $HgCl_2$ solution, with intervals of six days between each injection. Of this group 78% recovered. A further 50 animals received, again at intervals of six days, six or seven subcutaneous injections of 1 ml. doses of "isopatina mori", a proprietary preparation, resulting in a recovery rate of 96%.

[It is to be noted that British veterinarians regard epizootic lymphangitis as a very serious disease, because of its intractability and tendency to spread. Workers in some countries do not regard the disease as so important.—Ed.]—M. LANDAU.

GOPALAKRISHNAN, V. R. (1942). **Treatment of Equine Surra in Assam.**—*Indian J. vet. Sci.* **12.** 53–60.

G. claims to have obtained uniformly satisfactory results by treating with naganol over 300 surra-infected ponies in Assam during 1935–39. The drug was given intravenously in two injections, the first of 50 ml. of a 4% solution given as soon as parasites were seen in the blood, the second of 50 ml. of a 6% solution six days later. Treated animals were observed for three months and no relapse occurred. The prophylactic action of naganol is also stressed and its use in surra-infected areas advocated.—H. N. RAY.

HORNBY, H. E. (1941). **Examination of the Trypanocidal Value of Anthiomaline.**—*J. S. Afr. vet. med. Ass.* **13.** 90–92.

The value of lithium antimonyl thiomalate (anthiomaline) was tested on animals infected with *T. congolense*, *T. vivax*, and *T. brucei*. All the cases treated were chronic infections. It was found that the action of the drug was about the same as that of antimony tartrate and antimosan. It was slightly more irritant than antimosan and repeated injections caused severe reactions. There was no evidence that it was more toxic than the other two drugs.—E. M. ROBINSON.

MARSHALL, E. K. (1942). **Chemotherapy of Avian Malaria.**—*Physiol. Rev.* **22.** 190–204.

This is a review of research carried out on the chemotherapy of avian malaria. Canaries infected with *Plasmodium relictum* have been most commonly used; other studies have been made with *P. gallinaceum* in the chicken, *P. lophurae* in chickens and ducks, and *P. relictum* in the pigeon. Infections have been initiated by intraperitoneal, intramuscular, or intravenous inoculation of trophozoites or sporozoites. Hardly any attention has been paid in dosing to the quantity of parasites injected. Various workers have found that the most satisfactory method is intravenous injection with blood containing numbers of *P. lophurae*. Drugs have been administered by injection, by stomach tube, and mixed with the food. The commonly used dosage schedule is one dose daily for six days. The criteria for assessing the antimalarial qualities of drugs are :– (1) reduction of blood-parasite-concentration time curve, (2) significant delay in the incubation period, and (3) decrease in relapse rate. Where there is a high mortality amongst untreated birds, the survival time or the percentage survival may have advantages over these responses. M. criticizes with justice some of the quantitative methods used for comparing the activity of drugs, *e.g.* it is open to question whether the chemotherapeutic index of a drug determined for a bird is of any value in estimating the drug for human clinical use. Assaying the therapeutic effect of a drug in birds and of its toxic effects in mammals is, however, admittedly the most satisfactory method at present. Accurate comparisons of drugs on a single daily dosage schedule are impossible, owing to differences in rate of absorption, excretion, etc. Comparison of activity based on a dosage schedule where more or less constant blood concentration is maintained, is probably more reliable. A review is given of the therapeutic effects of quinine and other alkaloids of cinchona bark, stovarsol, sulphanilamide, sulphapyridine, etc. At least four stages in the malarial life-cycle are considered to be open to drug action, *viz*, (1) sporozoites, (2) trophozoites, (3) gametocytes, and (4) hypothetical forms responsible for relapse. Very few studies have been made on the effects of drugs on sporozoite infections or exo-erythrocytic stages and much more requires to be done on such possible effects. A review of the subject suggests that more data are required concerning species and strain susceptibility to drugs. The difficulty of cultivating plasmodia *in vitro* handicaps investigations into the mechanism of the action of drugs, but M. considers that the primary action of the drugs is on the parasite and not on the body defences. There is a valuable list of references.
—C. HORTON SMITH.

BOGORODITSKIĬ, A. V. (1941). Khimioprofilaktika piroplazmoza i fransaielloza piroplazminom. **[Prevention of Bovine Piroplasmosis with Piroplasmin].**—*Veterinariya, Moscow.* No. 3. pp. 98–102. [French summary].

Twenty-eight healthy animals, 1–2 years old, were inoculated with *Babesia bigemina* and 16 were treated with piroplasmin to investigate its prophylactic effect, the other 12 being left untreated. Five of the 16 animals were given the piroplasmin in the second half of the incubation period, four in the first half of the incubation period, two simultaneously at the time of

inoculation, three two days before, and two one day before inoculation. Of the 11 animals treated with piroplasmin during the incubation period or simultaneously at the time of inoculation seven did not become ill, three were only slightly ill, and only one showed marked signs of the illness (appearance of piroplasms in the blood). Ten of the 12 control animals were severely affected and two only slightly. Treatment of animals with piroplasmin before infection proved much less effective.

When animals, infected with *Françaiella colchica*, were treated with piroplasmin, no satisfactory results were obtained.—E. R. PARISER.

ABRAMOV, I. V. (1939). Primenenie piroplazmina pri piroplazmozakh ovets. [**Use of Piroplasmin in Ovine Piroplasmosis**].—*Sovyet. Vet.* No. 6. pp. 30–33.

Favourable therapeutic results have been obtained under experimental and field conditions in *Babesiella ovis*, *Françaiella ovis*, and *Piroplasma ovis* infections; a course of 1·5–2 mg. of piroplasmin per kg. body weight divided into small doses should be given at intervals of 2–3 days. In some animals, temporary dyspnoea, salivation, and tremor were observed after injection. Piroplasmin does not possess prophylactic properties and does not sterilize the body completely from piroplasms, even after several injections of increased doses. The therapeutic doses can be repeated after 2–3 days.
—A. MOLDAWSKY.

LENNOX, F. G. (1941). **Some Experiences in the Preparation of Sheep Blowfly Dressings and a Description of a New Boric Acid Mixture.**—*J. Coun. sci. industr. Res. Aust.* **14.** 77–87.

The characteristics of the ideal dressing are outlined. These include stability, low viscosity and surface tension, absence of damage to fleece, resistance to atmospheric decomposition, high toxicity for maggots, low toxicity for the sheep, promotion of healing, prevention of re-strike, cheapness, and ease of preparation from a powder mixture which can be packed and transported at low cost.

Attempts to produce satisfactory dressings without boric acid were unsuccessful. Water-in-oil emulsions penetrated well and withstood weathering, but retarded healing. Oil-in-water dressings penetrated poorly unless wetting agents were added, but did not interfere with healing. The following larvicides were rejected after extensive tests:—copper oleate, lead oleate, arsenicals, sodium selenite, naphthalene, chloracetamide, cadmium chloride, salicylic acid, tetramethylthiuram monosulphide (vulcafor MS), and methylene blue. It is considered that the most important constituent of a dressing is a stomach larvicide that will persist in the wound. Boric acid fulfils the requirements for such a larvicide. Contact larvicides are of secondary importance because the quick-killing effect produced is believed to be a much less important property than lasting stomach toxicity, and can usually be conferred on a dressing without difficulty: the incorporation of about 2% of any of the organic liquids which show high contact toxicity [see LENNOX—*V. B.* **12.** 32.] such as benzol, carbon tetrachloride, or carbon bisulphide produces spectacular quick-killing effects.

The new dressings described consist of boric acid, bentonite, tar oil, and a wetting agent. The dressings, B.T.B. 15 and B.T.B. 30 contain 15 and 30% boric acid respectively. B.T.B. 15 appeared to be as satisfactory as B.T.B. 30 and is the fly dressing now recommended. It is made as follows:—mix 4½ lb. boric acid with 14 oz. bentonite and 2 oz. wetting agent ("agral 2" was used) to a uniform powder. Add 2½ gal. water and stir for at least 10 min. Finally add ½ pint tar oil (straight fraction, boiling range 170°–210°C.) and stir for a further 10 min. [Tar oil is no longer available, but can be replaced by either (a) a mixture of equal parts of power kerosene and "creosote 259", or (b) a mixture of equal parts of power kerosene and "middle oil 43".]

This method of preparation must be followed in order to obtain a stable mixture. For marketing, the boric acid, bentonite, and wetting agent can be supplied ready mixed, and the tar oil separately.

The components in the mixture are described and their functions indicated. The stability, viscocity, fleece-penetrating properties, larvicidal effect, toxicity to sheep, cost, and tests on fly strikes are discussed.
—H. McL. GORDON.

FRENEY, M. R., LIPSON, M., & GRAHAM, P. H. (1941). **Studies on Some Ectoparasites of Sheep and their Control. 2. Chemical and Biological Studies on Certain Arsenical Dipping Fluids.**—*Pamphl. Coun. sci. industr. Res. Aust.* No. 108. pp. 27–38. [For part 1, see *V. B.* **12.** 593].

LIPSON, M. (1941). **Studies on Some Ectoparasites of Sheep and their Control. 3. Chemical Observations on Commercial Powder Sheep Dips with Special Reference to Their Arsenic Content.**—*Ibid.* pp. 39–44.

II. Sheep infested with keds (*Melophagus ovinus*) and lice (*Bovicola ovis*) were dipped 2½–3 months after shearing in an experimental plunge dip, which is illustrated. This was designed to provide for collection of liquid draining from the sheep. The time of immersion was 30 seconds, this being the average period of immersion recorded in normal dipping practice.

Solutions of the following, adjusted to contain 0·2% arsenic, were used:—arsenic acid, sodium arsenate, arsenious acid, sodium arsenite, glycero-arsenious acid, and a suspension of arsenic trisulphide. Pentavalent arsenic compounds did not kill all the keds but eliminated lice for the period during which the sheep were under observation (26 days). Soluble trivalent arsenicals were effective in killing all adults of both parasites, but whether complete eradication of the parasites in all stages of their life-cycles results from dipping in these compounds was not established. A suspension of arsenic trisulphide had only slight toxicity immediately after dipping and little residual toxicity. It is suggested that solutions of sodium arsenite could be used as a criterion in critical dipping tests for the control of keds and lice of sheep.

Sheep with 10–12 weeks' wool removed 1–1½ gal. of liquid from the dip, but about half of this amount drained off the sheep on standing, *i.e.*, ¾–1 gal. of dipping fluid was retained in the fleece of each sheep. The liquid draining from the sheep had a similar composition to the original dip when soluble arsenicals were used, but when an insoluble suspension of an arsenical was used the liquid draining from the sheep had an appreciably lower arsenic content.

The suspension of arsenic trisulphide was more stable after sheep had passed through the dip, probably due to the presence in the dip liquid of suint and wool wax leached out of the fleece of the sheep during dipping.

III. Five proprietary dipping powders were analysed and were found to consist mainly of free sulphur (av. 61·4%). Arsenic was present mainly as sodium arsenite, but some arsenate was present. Insoluble derivatives of arsenic and sulphur formed about 7% of the powders. Small amounts of organic material such as derris were present. Analyses of samples taken before and after dipping showed that there was little decrease in the arsenic content, but that the relative amount of soluble arsenic increased. The necessity for analysing samples as soon as collected is

stressed, for although total arsenic content does not alter, the relative amounts of soluble and insoluble forms do.—H. McL. Gordon.

Kurchatov, V. I. (1941). Opyty po primeneniyu piretruma v bor'be s nekotorymi ektoparazitami domashnikh zhivotnykh. [**Use of Pyrethrum against Ectoparasites of Domestic Animals**].—*Veterinariya, Moscow.* No. 2. pp. 97–103. [French summary].

Laboratory and field experiments showed that pyrethrum preparations are very effective against a great number of ectoparasites, such as fleas, lice, and ticks of domestic animals and poultry. The ixodid ticks proved to be much more sensitive to the action of the pyrethrum than the other parasites. The action of the preparation on the parasites is described and the effect of pure pyrethrum and of mixed preparations is discussed. Particularly effective mixtures are combinations of pyrethrum with talc in the proportions of 1 : 1 and 1 : 3. A detailed account is given of the effect of various preparations on the parasites and on the different stages of development. Pyrethrum preparations are also recommended in the protective treatment of domestic animals.

The article contains a review of work carried out on the subject by other investigators.—E. R. Pariser.

Robinson, G. G. (1942). **The Penetration of Pyrethrum through the Cuticle of the Tick,** *Ornithodorus moubata* **Murray (Argasidae).**—*Parasitology.* **34.** 113–121.

Mineral oils were found to induce swifter penetration of pyrethrins through the cuticle of the larva of *O. moubata* than vegetable oils.—W. Moore.

Breer. (1942). Gasbaracke zur Läuse- und Räudebekämpfung. [**Gas Boxes for Treatment of Louse Infestation and Mange in Horses**].—*Z. Veterinärk.* **54.** 192–197.

Details are given with diagrams and illustrations for the construction of small gas boxes for the treatment of louse infestation and mange in horses. The boxes usually hold four horses; they have no floor, in order to allow rapid erection and transport, and have double walls to conserve heat. Bars in front of and behind the horse keep it in position in the stall and prevent it from drawing its head into the gas chamber. In winter the box must be heated before sulphur fumes are produced. The fumes from 1–1½ kg. of sulphur are said to give satisfactory results. When the sulphur has burnt for half-an-hour a good concentration of fumes has usually been reached; the horses are left another hour in the box after this interval. Excellent results are reported.
—E. R. Pariser.

Gordon, R. M., & Seaton, D. R. (1941). **A Histological Comparison of the Effects of Certain Drugs on Scabies, as Studied in Rodent Infections.**—*Ann. trop. Med. Parasit.* **35.** 247–268.

Tetraethylthiuram monosulphide was found to be more lethal and rapid in action for the mites and eggs of *Notoëdres* sp. than benzyl benzoate and dimethylthianthrene. The drugs were mixed with an equal quantity of the methyl ester of the fatty acids of cocoanut oil, and the mixtures rubbed in for 3 min. Each mixture penetrated the normal skin within 15 min., and reached at least 90% of mites and eggs. To disinfect the skin completely, two applications of tetraethylthiuram monosulphide with an interval of at least four days between each application were necessary.—W. Moore.

Eckell, O. A., & Orliacq, C. (1942). El vermifugo de Lagaillarde en la estrongilosis equina. [**Treatment of Equine Strongylosis by Lagaillarde's Vermifuge**].—*Rev. Med. vet., B. Aires.* **24.** 26–34.

The authors treated 23 cases of equine strongylosis with a modification of Lagaillarde's vermifuge [see *V. B.* **4.** 59]. In 17 cases strongyle eggs disappeared after one treatment; in the remainder a second treatment was administered 30–40 days later. No unfavourable sequelae were noted.—Miller Watson.

*Bendixen, H. C. (1940). [**Phenothiazine Therapy of Abomasal and Intestinal Strongylosis in Sheep**].—*Medlemsbl. danske Dyrlaegeforen.* **23.** 307–327. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 23].

In comparative tests, phenothiazine proved more effective than copper sulphate and nicotine sulphate mixture for the control of parasitic gastritis in sheep. The gain in live weight was greater in sheep treated with phenothiazine. After a single dose egg counts dropped to 10% of their previous levels, but even after three doses, a few eggs could still be found in the faeces.
—M. Landau.

Quevedo, J. M. (1942). Resultados obtenidos con la fenotiazina en caballos portadores de parásitos gastrointestinales. (Nematodes—lombrices o gusanos redondos).—[**Results of Phenothiazine Therapy of Helminthiasis in Horses**].—*Rev. Med. vet., B. Aires.* **24.** 13–25.

Q. treated a number of horses for nematode infestation with doses of 20–50 g. of phenothiazine, according to size; larger doses were given in a few cases. Good results were obtained and no toxic effects were noted.
—Miller Watson.

Gordon, H. McL. (1942). **A Note on the Possible Anthelmintic Value for Sheep of Phenothiazine Incorporated in Feed or Lick.**—*J. Coun. sci. industr. Res. Aust.* **15.** 54–55.

Daily doses for five days of 1–2 g. phenothiazine were effective against *Haemonchus contortus* and *Oesophagostonum columbianum,* but not against *Trichostrongylus* spp. A mean daily intake by weaners in pens during a period of 15 days of 0·4–1·4 g. phenothiazine in a food supplement, caused fairly good reduction in the numbers of *H. contortus* developing from larvae administered concurrently, but a similar effect was not obtained when *O. columbianum* larvae were administered. When adequate amounts of phenothiazine were consumed as a lick by sheep in pens or as a food supplement in a field trial, the anthelmintic effect against *H. contortus* and *O. columbianum* was satisfactory, but effects against *Trichostrongylus* spp. were very slight. When sheep consumed only small quantities of lick or food containing phenothiazine, there was temporary but great reduction in the number of larvae developing in faecal cultures, as well as reduction in the number of eggs in faeces, but no apparent reduction in the number of worms present in the gut. These effects would temporarily reduce pasture contamination, but would not relieve the infestation of the sheep. Further work is necessary before the administration of phenothiazine in salt licks or in food supplements can be recommended.
—H. McL. Gordon.

Franklin, M. C., & Powning, R. F. (1942). **The Influence of Storage on the Chemical Composition of Nicotine Sulphate and Copper Sulphate Drench.**—*Aust. vet. J.* **18.** 72–75.

Copper sulphate and nicotine sulphate anthelmintic mixtures deposit a sludge on standing. This can be prevented by the use of suitable stabilizing agents, *e.g.,* 0·6 g. gum arabic per 200 ml. of mixture. The sludge formation had no significant effect on the concentration of either nicotine or copper sulphate in solutions stored for eight months. Solutions were used containing 2% and 12% respectively of copper sulphate and of nicotine sulphate.—H. McL. Gordon.

EMMEL, M. W. (1942). **Treatment of Infectious Keratitis in Cattle.**—*N. Amer. Vet.* **23.** 204.

An account of the use of an ointment prepared from a commonly used plant spray, "sulphocide", for infectious keratitis of cattle. It is said to have cured all but nine of 602 cases. It was also a good repellent. —C. V. WATKINS.

RUBBO, S. D., ALBERT, A., & MAXWELL, M. (1942). **The Influence of Chemical Constitution on Antiseptic Activity. I: A Study of the Mono-Aminoacridines.** —*Brit. J. exp. Path.* **23.** 69–83.

The physical and chemical properties of the five mono-aminoacridines are described. The biological properties of these compounds have been examined and compared with those of proflavine (2 : 8 diaminoacridine). Biological activity in this series runs parallel to chemical basicity and this is attributed to variation in the state of chemical union of the nitrogen atoms in the acridine nucleus. It is suggested that in the present series three classes of substances are to be distinguished, namely, class I with marked antiseptic action associated with a relatively high chemical basicity and the imino (= NH) grouping; class II with moderate antiseptic action, moderate basicity and the normal amino (–NH2) grouping, and class III with little or no antiseptic action and possessing an abnormally low basicity associated with an amino group that is masked through hydrogen bonding (–NH2 . . . N). Proflavine, 2- and 5-aminoacridines have been assigned to class I; 3- and 4-aminocridines to class II, and 1-aminocridine to class III. The toxicity for mice of these compounds places them in the same relative order as do the antiseptic values, but the toxicity for leucocytes follows another sequence. 5-aminoacridine is recommended for clinical trial as a non-staining antiseptic.—J. M. ROBSON.

COOK, E. S., KREKE, C. W., EILERT, M. R., & SAWYER, M. A. (1942). **Yeast Extracts to Overcome Depressant Effects of Germicide on Skin Respiration.**—*Proc. Soc. exp. Biol., N.Y.* **50.** 210–214.

Experiments are reported demonstrating that the toxic effects of dilutions of phenylmercuric nitrate as low as 1 : 100,000 on rat skin, as observed by manometric determination of skin respiration, can be overcome by the addition of a 1% yeast extract. Dilutions of germicide of 1 : 500,000 or less were still completely effective against *Staphylococcus aureus* in the presence of 1% yeast extract. It is therefore suggested that it should be possible to protect tissue against toxic action of germicides while maintaining germicidal efficiency.—R. A.

BASS, A. D. (1939). **An Experimental Comparison of Certain "Skin-Sterilizing" Agents.**—*J. Pharmacol.* **66.** 279–288.

The effectiveness of various chemical skin-sterilizing agents was investigated by using an *in vivo* skin graft method on rabbits. The depilated belly skin was carefully washed and marked off into areas of about 1 sq. in. and the antiseptic to be tested was rubbed vigorously over the square for 25 seconds. At the end of 3 min., a piece of skin approximately 15 mm. in diameter was removed under sterile conditions and dropped into 100 ml. of infusion broth and incubated at 37°C. for 48 hours. 70% ethyl alcohol was used as a standard of comparison for the various sterilizing agents tested.

Propyl-mercuric-chloride and mercresin were equally effective and superior to all other compounds studied; pyridyl-mercuric-chloride and phenyl-mercuric-nitrate were less effective. Results of a third group including iodine, merthiolate, metaphen, mercuric chloride, and mercurochrome showed that mercurochrome was the least effective and that 3·5% tincture of iodine was just as effective as 7%, but neither showed any superiority over the majority of the mercurials tested.—R. ALLCROFT.

BUSH, M. T., & BASS, A. D. (1942). **Experimental Comparison of Several Alkylmercuric Chlorides as "Skin Sterilizing" Agents.**—*J. Pharmacol.* **74.** 95–97.

The compounds R-Hg-Cl, in which R is methyl, ethyl, *n*-propyl, *n*-butyl, *n*-amyl, or *n*-heptyl, have been tested as skin disinfectants using the technique described in the preceding abstract. The 0·0036 molar solutions in 70% ethanol all gave a high percentage of sterile skin strips. The results show that solutions of the simple alkylmercuric chlorides are as effective as any and more effective than many of the commonly used antiseptic solutions when compared by this method. —J. M. ROBSON.

KLARMANN, E. G., & SHTERNOV, V. A. (1941). **Are Soaps Germicidal?**—*Soap.* **17.** No. 1. 23–26 and 70.

The germicidal properties of various soaps were investigated by the standard F.D.A. technique employing five organisms, *Salmonella typhi, Staphylococcus aureus, Bacterium flexneri*, a haemolytic streptococcus, and *Trichophyton rosaceum*. The soaps tested included (1) a series of potassium salts of homologous fatty acids from C_1 to C_{16} and C_{18}, (2) a group of commercial washing and toilet soaps, and (3) a series of technical soaps formed by the saponification of vegetable oils. Incubation was carried out at 37°C. Only salts of fatty acids of the homologous series with 8, 9 and 10 C atoms showed any pronounced germicidal activity, although fatty acids of these types do not occur in fats and oils employed in soap manufacture. The commercial soaps were so poorly germicidal that none merited the designation "disinfectant", "antiseptic", or "germicidal". One resin soap, however, was markedly germicidal to staphylococci and haemolytic streptococci, sufficiently so to merit further investigation of the possibility of including this type of soap with ordinary commercial soaps.—ALFRED EDEN.

PUBLIC HEALTH

DYSART, N. C. (1942). **The Veterinarian's Place in Public Health Work.**—*Proc. 45th Meet. U.S. Live Stk sanit. Ass., 1941.* pp. 59–62.

A laudatory article by a layman on the beneficial effects on public health in Columbus, Ohio, of having veterinarians on the Board of Health staff. Eight veterinarians are employed to inspect meat and meat products, milk, and dairies and to do other appropriate work. Some examples of public health benefit so obtained are given.—J. E.

—. (1942). **Report of the Committee on Communicable Diseases Affecting Man.**—*J. Milk Technol.* **5.** 141–145.

This report takes the form of an abstract and discussion on the U.S. Public Health Service report on milk-borne outbreaks of communicable disease in the U.S.A. in 1939. In that year there were four such outbreaks of typhoid fever, one of paratyphoid, nine of scarlet fever and septic sore throat together, two of bacillary dysentery, and 11 of gastro-enteritis. It is not stated how many of these outbreaks originated from cows or dairy personnel.—J. E.

GREEN, C. A. (1942). **Condition of Retailed Raw Milk in an Urban Area.**—*Brit. med. J.* July 4th. 9–10.

Sixty-six samples of retailed raw milk were examined in winter. The percentages failing the standard plate-count test, the presumptive *Bacterium coli* test, and the methylene blue reductase test (Milk Special Designations Order, 1936, Scotland; Milk Order, 1936, England and Wales) were 47, 53, and 47 respectively. Fifty-six samples were examined in the following summer, the corresponding percentages rising to 76, 78 and 66. 20% of these specimens contained virulent tubercle bacilli. G. considered compulsory pasteurization of milk to be an essential measure.

—M. H. KYAW.

SCHIEL, O. (1940–41). Erfahrungsbericht über die amtlichen tierärztlichen Milchuntersuchungen aus dem Jahre 1937/1938 im Regierungsbezirk Oberschlesien. **[Report of Official Veterinary Milk Inspection in the Government District of Upper Silesia, 1937-38].**—*Z. InfektKr. Haustiere.* **57.** 159–176 and 239–267.

This is a detailed report and discussion of milk control work for 1937 and 1938. The operations included systematic routine examinations and supplementary examinations in cases where pathogenic organisms had been detected. Out of 1,602 bulk samples from dairies, 48 contained tubercle bacilli, 235 brucella, and 7 mastitis streptococci. At supplementary individual milk tests these organisms were detected 5 times, 33 times, and once respectively. The work involved is described and considered from the viewpoint of herd infection and size of herd and case histories are given.

—O. D. JAMES.

—. (1942). Pflichtprüfungen und Eigenkontrollen der Frischmilchbetriebe. **[Obligatory Tests and Control of Fresh Milk Firms (Germany)].**—*Z. Fleisch- u. Milchhyg.* **52.** 129–132.

By an order of the Association of German Milk and Fat Traders of January 1st, 1942, all firms handling fresh milk or milk products must submit samples for testing for physical quality and for the presence of pathogenic organisms.

The tests are to be carried out 8–12 times a year depending on the quality class in which the milk and milk products are offered for sale. Detailed instructions on the prescribed tests are given: they are on the lavish scale and include tests for tubercle bacilli, brucella and mastitis streptococci by veterinary officers, as well as ordinary plate counts and other laboratory tests.

[This order appears to be very advanced in comparative public health milk testing work; we do not know, however, whether the association in question controls all milk sold in Germany.]—J. E.

*MAJOEWSKY, W. (1941). **[Hygienic Survey of Milk and Foodstuffs of Animal Origin in Holland].**—*Tijdschr. Diergeneesk.* **68.** 17–37. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 206].

An argument to the effect that milk control in Holland is unsatisfactory.

SMITMANS, H., & ESCHBAUM, T. (1941). Beitrag zum Nachweis von Abortus Bang-Bakterien in der Milch durch Tierversuch. **[Demonstration of *Brucella abortus* in Milk by Animal Inoculation Tests].**—*Z. InfektKr. Haustiere.* **57.** 302–310.

The authors investigated technical factors in the g. pig inoculation test for brucella infection in milk. They inoculated the animals in the usual way with milk sediment + cream mixture (centrifuged), killed them after 35–60 days and performed agglutination tests (slow tube) with their blood as well as cultural tests with organ suspensions.

In 222 positive results out of a total of 603 tests, both aggln. and cultural methods were positive in 118 cases, aggln. + and culture – occurred in 57 cases, and aggln. – and culture + in 47 cases. It is advised that both methods should always be used. With regard to the choice of organs for seeding the culture plates (Stockmayer's modification of Stafseth's medium), it was found in these tests that the spleen was most reliable, followed by the popliteal lymph node of the inoculated leg: the liver was much inferior. More positive results were obtained when the cultures were adjusted to pH 6·9 than when they were at pH 7·6, although it is recommended that cultures should be made at various pH values. Finally, it was determined that more reliable results are obtainable when two g. pigs, and not a single g. pig, are used for each milk sample; the use of three g. pigs is not advantageous.—O. D. J.

SCHÖNBERG, F., & MILBRADT, H. (1942). Zum Einfluss des Zellgehaltes in der Milch auf die Peroxydase-Probe. **[Influence of Cell Content of Milk on the Peroxydase Test].**—*Dtsch. tierärztl. Wschr.* **50.** 69–71.

Many workers have found that the peroxidase test for pasteurized milk may be negative (indicating efficient heating) soon after the heating process and positive later in the same sample. It is known that peroxidase is particularly abundant in the cells contained in milk, so it appears probable that cell content has an important influence on the test. The authors carried out several tests on this problem and confirmed the assumption that peroxidase can survive high-temperature short-time pasteurization by being protected from the heat by clumps of cells and coagulated protein. It is then gradually released if the sample is kept standing and so may cause a delayed positive reaction. This finding suggests that pathogenic bacteria may also survive pasteurization: this matter requires attention.

—J. G. CARR.

NÖRR, J. (1942). Ueber die französische Fleischbeschau. **[French Meat Inspection].**—*Z. Fleisch- u. Milchhyg.* **52.** 186–190.

There is in France no legislation exclusively devoted to meat inspection: instead the 1933 law for the control of bovine TB. had added to it nine paragraphs on meat inspection in general, which nominated veterinarians as experts in charge of abattoirs. There is, however, no legalized system of instructions in inspection methods, so that in practice a great deal of meat is only given a cursory visual inspection. In view of this laxity, N. was surprised at the extremely strict condemnation rules with regard to TB., by which whole carcasses are condemned owing to localized as well as to generalized TB. Since the 1940 armistice, this ruling has been amended.

The French did not carry out examinations for cysticercosis or trichinosis. German workers in occupied France have found the former to be not uncommon and the latter extremely rare.

The wide diversity of meat stamping marks, in spite of legislation (1936) to unify them, is commented upon. Finally, N. states that as a result of the German occupation the system in French abattoirs has been improved.—J. E.

BAARS, G. (1941). Ueber das Wesen der Fleisch- und Lebensmittelvergiftung durch Paratyphus-Enteritisbakterien. **[The Nature of Meat and Food Poisoning by Salmonella].**—*Dtsch. tierärztl. Wschr.* **49.** 4–6.

A review of the literature in support of each of two theories, *viz*, that salmonella food poisoning is due to the harmful effects of the organisms themselves and that it is due to a toxin secreted by the organisms.

Opinions are divided and no conclusions are drawn. —O. D. JAMES.

*SCHALK, A. (1941). Geflügel und Eier als Ursache bakterieller Lebensmittelvergiftungen in den letzten 20 Jahren. (Statistische Zusammenstellung). [**Poultry and Eggs as Causes of Bacterial Food Poisoning in the Last Twenty Years: Statistical Review**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 544].

According to official reports of the *Reichsgesundheitsamt* there were, from 1929–38, 61 outbreaks of food poisoning by poultry flesh, with 325 cases and five deaths. Goose and duck liver was most often involved. In 48 " cases ", meat poisoning organisms were detected (*Salmonella typhi-murium* in 78% and *S. enteritidis* in 9%).

Between 1933 and 1938 there were 175 outbreaks of food poisoning from eggs with 1,244 cases and 21 deaths. Duck eggs were commonly involved. In 145 " cases " the causal organism was isolated, being *S. typhi-murium* in 63·5% and *S. enteritidis* in 36·5%.

I. *KOLLATH, K. (1940). Paratyphusverhütung und die Kaki-Cambell-Ente. [**The Connexion between Khaki-Campbell Ducks and Human Paratyphoid**].—*Arch. Hyg., Berl.* **125.** 127. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 330].

II. SCHMIDT, K. (1941). Ueber die Infektion des Menschen mit Enteritisbakterien durch Enteneier. [**Human Paratyphoid from Duck Eggs**].—*Dtsch. tierärztl. Wschr.* **49.** 330–331.

I. K. reports an outbreak of paratyphoid in 96 people who had eaten fish salad with mayonnaise prepared with duck eggs; the eggs had been boiled for 10 min. K. suggested that the shopkeeper had infected his hands from infected egg shells and so had infected the salad. It was found later that *Salmonella typhi-murium* was excreted in the faeces of one of the ducks, but all the eggs examined were free from infection.

II. S. criticizes K.'s conclusions on the ground that organisms would not multiply in the mayonnaise salad. He also deplores the fact that the appropriate veterinary food inspection authority was not called in by K. to assist in the tracing of the source of infection, as has repeatedly been advised in government circulars. —J. E.

BUCHBINDER, L., SOLOWEY, M., & SOLOTOROVSKY, M. (1941). **Studies on Microorganisms in Simulated Room Environments. IV. The Effect of Survival on the Pathogenic Properties of Streptococci: Mouse Virulence.**—*J. Bact.* **42.** 615–630. [For previous parts, see *V. B.* **12.** 472].

BUCHBINDER, L., SOLOTOROVSKY, M., SOLOWEY, M., & RUHL-KOUPAL, J. (1941). **Studies of Microorganisms in Simulated Room Environments. V. The Effect of Survival on the Pathogenic Properties of Streptococci; Properties other than Mouse Virulence.** —*Ibid.* 631–634.

BUCHBINDER, L., & SOLOTOROVSKY, M. (1941). **Studies on Microorganisms in Simulated Room Environments. VI. The Disappearance of Vaccinia Virus from Air.** —*Ibid.* 635–641.

IV. The well known group B, strain 090 of Lancefield was used in this study; its origin is uncertain but it is highly virulent for mice.

After spraying into the chamber [see part I], bacteria were collected on blood agar plates either directly or after vigorously brushing the floor of the chamber with a sterile broom. Alternatively, organisms were allowed to collect in open petri dishes which were removed at intervals and poured with sheep blood agar. After 18 hours' incubation, colonies were picked into blood broth, incubated for 18 hours, and the virulence of this culture or a second blood broth culture tested in mice.

Most cultures recovered 8–10 days after spraying into the chamber were unaltered in virulence. A small number underwent a slight diminution in mouse virulence, and in antigenicity as tested in rabbits. The modified cultures, however, tended to return to maximal virulence. The majority of these modified cultures were obtained at the end of 48 hours after spraying and it is suggested that at that time there was a maximum of modified viable organisms. Illumination from a fluorescent lamp had little effect on the results.

V. Two group A strains and one group C strain of streptococci were sprayed into the illuminated chamber. As in IV, the properties of the second 18-hour broth cultures were tested. Cultures from organisms incubated up to a period of seven days after spraying showed no loss of ability to grow in defibrinated human blood, lyse human blood clot, produce a skin toxin, or be agglutinated by homologous immune serum.

The public health significance of these results is discussed. [It is clear that there was very little alteration in the properties of the organisms; an obvious criticism of the work, however, which might be difficult to overcome, is that it was not the actual virulence and power of multiplication of surviving organisms that were tested but that of the young cultures grown from them].

VI. Vaccinia virus grown on the skin of rabbits was sprayed into the chamber and recovered on the exposed intact chorio-allantoic membrane of the developing hen egg. The virus grows in discrete pocks and quantitative work could be carried out.

There was an approximate 40% decrease per hour in the rate of deposit. This is about twice as great as that for streptococci and, it being assumed that the sprayed particles are about the same size, indicates that vaccinia virus succumbs more quickly to the environmental conditions. Experiments showed that the virus could remain viable and suspended in the air for at least eight hours, but only about 2% of the sprayed virus settled within a period of seven hours.—JOHN FRANCIS.

TECHNIQUE AND APPARATUS

BARTEL, H. (1942). Verfahren zur Rückgewinnung des Agars aus gebrauchten Nährböden. [**The Recovery of Agar from Used Culture Medium**].—*Tierärztl. Rdsch.* **48.** 203–207.

The used agar medium was placed in a constantly stirred 0·7–1·0% solution of chloramin for 2 or 3 days; next, the broken-up residue was washed in running water for 2 or 3 days, and then pressed in muslin bags, being finally hung up in these bags to drain. When a certain calculated quantity of water was left (method of calculation given in detail), the agar was ready for incorporation in further media. By this method, agar could be recovered 4–6 times at least.—E. COTCHIN.

CLAUBERG, K. W. (1941). Ist Agar in der bakteriologischen Nährbodentechnik durch Kieselsäure-

gallerte ersetzbar? [**Is Agar Replaceable by Waterglass in Culture Media?**].—*Zbl. Bakt. I.* (*Orig.*). **147.** 75–79.

A waterglass-containing medium is made up as follows:– 3 parts of glycerin-asparagin-water (glycerin 6 parts, asparagin 0·4 parts, dist. water 100 parts, pH 7·5); 6 parts of broth, pH 7·5; 0·6 parts of chemically pure waterglass; adjusted to pH 7·2 with 25% phosphoric acid. Serum or blood may then be added.

Staphylococci, salmonella, and coliform organisms grew well on this medium. Pigment production by chromogenic organisms was reduced. C. suggests that waterglass is a substitute for agar that is worthy of further trial.—E. COTCHIN.

*DELITZ, H. (1940). Wachstum von anspruchsvollen Bakterien auf Fleischwasseragar mit Zusatz von Kalt sterilisierten Säften aus Stierhoden oder aus Schilddrüse, oder Tonsillen oder Zirbeldrüse, vom Schwein. [**Growth of Bacteria on Meat-Broth Agar with the Addition of Cold Sterilized Fluid from Bovine Testis or from Thymus, Tonsils, or Pineal Body of Pigs**].—*Arch. Hyg., Berl.* **124.** 96–104. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **138.** 430].

Meat-broth agar with testicle filtrate was an excellent medium, followed in order of efficiency by broth agar plus thyroid filtrate, whilst tonsil and pineal body filtrate had an inhibitory effect on bacterial growth. The effects of these four tissue filtrates varied, however, with different bacteria. The work is being continued. The bacteria used in the tests are not named in the abstract.

FLEMING, A. (1942). **A Simple Method of Using Penicillin, Tellurite, and Gentian Violet for Differential Culture.**—*Brit. med. J.* May 2nd. 547–548.

It is shown that by spreading two drops (about 80 c.mm.) of 1 : 3,000 gentian violet on one-half of a blood agar plate inoculated with a mixture of large numbers of staphylococci and a relatively small number of streptococci, pure colonies of streptococci can be obtained.

This method is similar to those used previously by FLEMING (1929 and 1932) for obtaining selective cultures by applying penicillin or potassium tellurite to the surface of an ordinary culture medium, instead of incorporating the selective bacteriostatic agent in the medium. It is pointed out that whatever chemical is used with this technique, it is necessary when spreading it over half the plate, to start where the inoculum is lightest and proceed towards the heavier inoculum.

The advantages of this method are discussed.

—M. H. KYAW.

SAVAGE, G. M., & HALVORSON, H. O. (1941). **The Effect of Culture Environment on Results Obtained with the Dilution Method of Determining Bacterial Population.**—*J. Bact.* **41.** 355–362.

In using the dilution method for estimation of a bacterial population, a table was constructed for calculation of the probable population values, evolved from the statistical evaluation of experimentally determined "codes". These codes express the numbers of subculture tubes showing growth from each of three successive tenfold dilutions. To give an illustration of what is implied by the code system, a broth culture of an organism was diluted successively ten times up to a final dilution of 1 : 1,000,000. From each dilution ten 1 ml. samples were withdrawn and transferred separately to subculture tubes which were incubated for a suitable period (usually 48 hours). The following numbers of tubes showing growth at the stated dilutions were obtained:– 1 : 10, ten growths; 1 : 100, ten growths; 1 : 1,000, ten growths; 1 : 10,000, seven growths; 1 : 100,000, one growth, and 1 : 1,000,000, no growths. The "code" number with 1 : 10,000 as the middle dilution was 10–7–1; with 1 : 100,000 as the middle, the code was 7–1–0. The frequency of occurrence of the 89 most commonly occurring codes is given in a table, and from this an estimate of the original bacterial population is made.

The effect of the addition of 8 or 9% NaCl to broth cultures of *Staphylococcus aureus* was then studied by the above method. It was found that very uncommon codes resulted frequently when such an unfavourable culture medium was used for subculturing bacteria with readings taken after 48 hours of incubation. These uncommon codes gave rise to more common codes as the period of incubation was prolonged. The type of uncommon code most uniformly appearing was the gradual type, in which the change from all growths to none at all is spread over four or more successive dilutions. The appearance of uncommon codes of this gradual type should warn the experimenter that the medium being used for subculturing may be unfavourable for growth and therefore longer periods of incubation must be employed, of such a duration as to indicate greater stability in the readings and conformity with the more frequently occurring codes.

The reader is referred to the original for further details.—ALFRED EDEN.

WITTE, J. (1940). Verbesserung von Verfahren zum Nachweis der Paratyphus-Enteritisbakterien. [**Improvement in the Demonstration of Salmonella**].—*Dtsch. tierärztl. Wschr.* **48.** 547–549.

The addition of 1% lactose and 1% saccharose to the original Gassner medium (metachrome yellow + water blue) increases its value by aiding the growth of lactose- and saccharose-fermenting strains of *Bacterium coli*, and so reducing the number of strains to be identified. Higher concentrations of sugar in the medium should be avoided so that salmonella may not be obscured. Malachite green + phenol red plates are superior to brillant green + phenol red plates. Bierbrauer's and Mueller's enrichment fluids were tested and the addition of 10% ox bile increases the value of Mueller's tetrathionate solution. W. considers that Bierbrauer's modified solution of Hoder is the most satisfactory medium for the enrichment of salmonella, especially if malachite green and brillant green are added before and after inoculation of the enrichment fluid.—E. WEISSBERG.

MORGENSTERN, R. (1941). Saccharose und Adonit im Brillantgrün-Phenolrot-Agar. [**Saccharose and Adonite in Brilliant Green, Phenol Red Agar**].—*Z. Fleisch- u. Milchhyg.* **51.** 89–91.

By the addition of saccharose or adonite to brilliant green, phenol red agar, it is possible to eliminate more than a third of the "intermediate strains" of salmonella, the colonies of which resemble those of true meat-poisoning organisms. In some cases saccharose inhibits the growth of the "intermediate strains", whereas adonite may occasionally aid growth.—J. Z.

KÖSER, A., & WITTENBERG, K. (1941). Der Wert der nach Wolffram abgeänderten Löfflerschen Malachitgrünplatte. [**The Value of Wolffram's Modification of Löffler's Malachite Green Plate**].—*Dtsch. tierärztl. Wschr.* **49.** 573–575.

A malachite-green agar plate, with the addition of 1·5% lactose and 4% phenol red, was found to be superior to either a Drigalski plate or a brilliant-green phenol-red plate in inhibiting growth of coliform bacteria when examining faeces for salmonella. The medium was used successfully in isolating *S. enteritidis* type Kiel from the faeces of seven infected cows.—E. C.

WITT, J. (1942). Zur Frage des Nachlassens des Hemmungsvermögens der Malachitgrünphenolrotplatte gegen Colibakterien durch Lagern. [**On the Question of Loss of Selective Inhibitory Power for *Bacterium coli* by Malachite-Green Phenol-Red Plates due to Storage**].—*Tierärztl. Rdsch.* **48.** 188–189.

Contrary to previous opinion, the selective inhibiting power for *B. coli* by malachite-green phenol-red plates was found not to be reduced appreciably by storage for up to 20 days after preparation before use. The method of preparation of the plates is described in detail.—E. COTCHIN.

ANDRESEN, P. H. (1941). Anaerobe Züchtung. I. Ein einfaches und schnelles Verfahren zur anaeroben Züchtung in Reagenzgläsern. [**Anaerobic Cultivation. I. A Simple and Rapid Method of Anaerobic Culture in Test Tubes**].—*Zbl. Bakt. I.* (*Orig.*). **148.** 159–160.

A method of producing anaerobic conditions in individual test tubes by means of a plug of cellulose soaked in pyrogallic acid.—JOHN FRANCIS.

MUELLER, J. H., & MILLER, P. A. (1941). **A Modification of Rosenthal's Chromium-Sulfuric Acid Method for Anaerobic Cultures.**—*J. Bact.* **41.** 301–303.

Production of anaerobic conditions in the McIntosh and Fildes' jar is relatively time-consuming and is not without danger. A method has been described [see *V.B.* **8.** 474.] which depends on the liberation of hydrogen from a mixture of chromium and sulphuric acid. The disadvantage of this method is that no CO_2 is produced. Sodium carbonate was added to the chromium powder to produce CO_2 and by this means the growth of *Clostridium tetani* was greatly accelerated. The method has given regular results.—JOHN FRANCIS.

LEUSDEN, F. P., & TÖLLE, W. (1941). Wachstumsförderung der Anaerobier durch Gelatine. [**Growth Promotion of Anaerobes by Gelatin**].—*Zbl. Bakt. I.* (*Orig.*). **147.** 273–283.

Gelatin was found to be of use, not only as a test medium for liquefaction but also as a growth-promoting addition to fluid differential media. 10% gelatin was added to infusion broth containing a variety of sugars to be tested, the medium being warmed before sowing. As litmus milk was considered possibly inhibitory to the growth of sensitive anaerobes, it was not added until the sown tubes had been incubated. Control lots of sugar media without added gelatin were used. Gelatin was found to encourage growth in most pathogenic and in several saprophytic strains of anaerobes.—D. L. R.

*JAKOB, A., & MAHL, H. (1940). Strukturdarstellung bei Bakterien, insbesondere die Kapseldarstellung bei Anaerobiern mit dem elektrostatischen Elektronen-Übermikroskop. [**Demonstration of Bacterial Structure, especially of Capsules in Anaerobes, with the Electron Microscope**].—*Arch. exp. Zellforsch.* **24.** 87–104. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 363].

Using a technique described in detail in the original paper, the authors examined several species of bacteria by means of the electrostatic electron microscope. It was found that several anaerobes, *e.g. Clostridium tetanomorphum* and *Cl. cochlearum* were surrounded by capsular material. There appeared to be no connexion between the pathogenicity of an organism and the possession of a capsule, as the latter could be demonstrated in completely non-pathogenic bacteria. The possibility of artefacts arising during the preparation of specimens is duly stressed.—M. LANDAU.

RIMINGTON, C. (1942). **Haemoglobinometry.**—*Brit. med. J.* Feb. 7th. 177–178.

Details are given of a method of estimating haemoglobin in which total blood pigments are estimated accurately by conversion of all the haem pigment present into pyridine-haemochromogen. The light absorption of the resulting pink coloured solution is measured in a photo-electric colorimeter. From a calibration factor, obtained by using known weights of pure haemin which are converted to pyridine-haemochromogen and the light absorption measured, the haemoglobin content of the blood is calculated. Other means of determining the concentration of the pyridine-haemochromogen solution without the aid of a photo-electric colorimeter are suggested.—J. P. GARDNER.

BANDT, K. (1940). Stufenphotometrische Bestimmung der Farbe normaler und pathologisch veränderter Pferdeharne. [**Photometric Determination of the Colour of Normal and Pathological Equine Urine**].—*Wien. tierärztl. Mschr.* **27.** 483–494.

A description of the Pulfrich photometer and its use for the determination of the light absorption of urine samples. The absorption is greater in diseases in which the rate of destruction of red blood corpuscles is increased.—H. BLASCHKO.

THOMAS, A. D., CLARK, R., & SCHULZ, K. (1940). **A Method for Preparing Sections of Bone Without Decalcification.**—*Onderstepoort J. vet. Sci.* **15.** 295–297.

The necessity is stressed of being able to study bone in thin sections without decalcification which may alter the structure. In the authors' method it is not pretended that all difficulties are solved, but excellent sections could be obtained of the softer bones and of those that were only moderately hard. The process used is essentially a double embedding method with celloidin and paraffin, the various steps used being given in detail. The main feature of the process is the use for impregnation of cedarwood oil, which has an indirect softening effect and may possibly lubricate the path of the knife through the calcareous matrix. The value of the double embedding lies in the good support given to the tissue while the microtome is cutting.—E. M. R.

BAKER, J. R. (1941). **A Fluid for Softening Tissues Embedded in Paraffin Wax.**—*J. R. micr. Soc.* **61.** 75–78.

Materials embedded in paraffin wax often become so brittle that satisfactory sectioning is impossible. This state can be remedied by soaking the block in water which penetrates to the embedded tissue. B. carried out experiments to find a fluid which would be preferable to water in the speed of penetration. The tissue used in these experiments was mammalian liver which is frequently very difficult to section. Mammalian pancreas and kidney and other tissues were also tried. Picro-formol-alcohol which preserves glycogen was the fixative most generally used, as it tends to make tissues brittle and crumbly unless special measures are taken. Other fixatives used were formol saline and Zenker's fluid without acetic acid. Special care was taken to make blocks of the same tissue comparable, to expose the tissue in each block by a knife cut, and to soak the blocks in the various fluids for similar periods, usually 24 hours. Blocks were cut at the same thickness after drying. The most satisfactory mixture for speedy

softening of embedded tissue was found to be a mixture of 90 ml. of 60% alcohol and 10 ml. of glycerin, in which the tissues were soaked overnight. The mixture prevents extraction of glycogen and water-soluble proteins. —C. HORTON SMITH.

SOLIS, J. A. (1941). **Notes and Further Observations on Embalming Animals for Gross Anatomy Dissections.**—*Philipp. J. anim. Indust.* **8.** 71–78.

A discussion of a technique of preparing carcasses for anatomical dissection. No new observations are made.—C. W. OTTAWAY.

*TURICH, M. (1941). Über die Desinfektion der Knochen bei der Verarbeitung in Gelatinefabriken. **[Disinfection of Bones at Gelatin Factories].**—*J. Microbiol., Moscow.* No. 6. 59–64. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 536].

When bones were artificially infected with anthrax bacilli, then heated in water at 80°–85°C. for 4–4½ hours and macerated with various concentrations of HCl (0·3–8%) for 7–12 days, the anthrax bacilli were not completely destroyed. To ensure complete disinfection, it is recommended that the bones be broken into pieces not larger than 4×5 cm. and boiled, if possible under pressure, for two hours in a closed vessel.—E. R. P.

INSKO, W. M., Jr., STEELE, D. G., & HINTON, C. M. (1941). **Effect of Formaldehyde Fumigation on Mortality of Chick Embryos.**—*Bull. Ky agric. Exp. Sta.* No. 416. pp. 119–138.

Formalin fumigation of incubating eggs was carried out at levels 3–7 times the concentration usually recommended (35 ml. formalin, 17·5 g. potassium permanganate per 100 cu. ft.). Embryos on the second and third days of incubation were found to be most susceptible to the action of formaldehyde. The hatching chick can withstand fumigation, but this tolerance is lost when the chick has dried.

Provided that fumigation was not carried out during the susceptible periods, a concentration of fumigant 3–4 times the normal could be used without seriously increasing mortality.

The bulletin contains a useful section giving practical recommendations for the fumigation of incubators.—F. D. ASPLIN.

BUTLER, R. L., Jr., & CHRISTENSON, R. O. (1942). **A Simple Apparatus for Determining the Viability of Embryonated Helminth Ova.**—*J. Parasit.* **28.** 131–134.

This is a detailed description of an apparatus by which two-year-old cultures of the embryonated eggs of *Heterakis gallinae* and *Ascaridia galli* were activated to observe motility. The method consisted essentially of heat stimulation of the eggs by means of an electric current.—M. L. BINGHAM.

MISCELLANEOUS

KILLHAM, B. J. (1942). **A Newer Species—the Extension Veterinarian.**—*Proc. 45th Meet. U.S. Live Stk sanit. Ass., 1941.* pp. 111–117.

Without detailing the official principles and policy of the veterinary extension service in the U.S.A., K. discusses it and its place in livestock husbandry. The extension veterinarian's main function appears to be to educate the farmer in the principles of disease economics and control. This results in good contact between the farmers and veterinarian and in the calling in of veterinary services to the best advantage.—J. E.

WATERS, N. F. (1942). **Genetics and Pathology—Co-Partners in Science.**—*Proc. 45th Meet. U.S. Live Stk sanit. Ass., 1941.* pp. 142–149.

A general lecture on the role of genetics in animal pathology, with notes on some examples of inherited defects and on inherited resistance to disease.—J. E

PHILP, R. C. T. (1942). **The Nationalisation of Veterinary Services.**—*Tasm. J. Agric.* **13.** 12–14.

All veterinary work in Tasmania was nationalized in February, 1942, veterinary surgeons being appointed on a district basis. They carry out animal disease control for the Government as well as private practice, partly at fixed fees. A list of districts and veterinary officers is given.—J. E.

NALETOV, A. N. (1940). Nauchno-issledovatel'skaya rabota v voenno-veterinarnoĭ akademii. **[Research Work at the Military Veterinary Academy].**—*Sovyet. Vet.* No. 5. 87–88.

The main effort of the Academy has been directed towards improving the country's livestock and finding methods for the more effective treatment of sick and wounded horses. Work was done on the diagnosis of disease in horses, vaccination against, and diagnosis of, brucellosis in farm animals, improvement of anaesthetics, gastro-intestinal diseases of horses and their treatment, the construction of a special apparatus for the direct internal observation of the stomach, treatment of infected wounds and wound diagnosis, and blood transfusion, especially heterogenous blood transfusions with special reference to war-time conditions.—E. R. P.

OLVER, A. (1942). **Animal Husbandry in India.**—*J. R. Soc. Arts.* **90.** 433–446. Discussion pp. 446–451.

A valuable review dealing with the complex nature of animal husbandry problems in India. O. refers to such factors as (1) the general lack of appreciation of the fundamental principles which underlie proper breeding, feeding and management of livestock, and the great need which exists for a balanced system of land utilization, (2) the lack in most provinces and states of any expert advisory animal husbandry organization dealing solely with livestock, and (3) the limiting factor of disease to livestock improvement and the numerical inadequacy of existing Indian veterinary services. He stresses that livestock improvement should be pursued by the selection of indigenous cattle and not by the importation of European breeds which are unsuited to Indian conditions.

In the subsequent discussion, speeches dealt with the need for improved methods of cultivation and the necessity for the development of veterinary education within India to meet the country's peculiar problems. —N. J. SCORGIE.

KAURA, R. L. (1942). **Animal Quarantine in the Provinces and States.**—*Indian Fmg.* **3.** 8–9.

The need is emphasized for (1) proper legislation similar to the Cattle Disease Act in force in Madras, the Central Provinces and recently in Sind, (2) an intelligence service in each province and state to report the outbreak of any contagious disease to the veterinary department, and (3) the establishment of quarantine stations in places through which cattle are imported. The indiscriminate migration of cattle from one province or state to another is responsible for the spread of contagious diseases in the country.—M. K. SRINIVASAN.

BRAMBELL, F. W. R. (1942). **Intra-Uterine Mortality of the Wild Rabbit,** *Oryctolagus cuniculus* **(L.).**—*Proc. roy. Soc.* Ser. B. **130.** 462–479.

An examination was made of 189 marketable pregnant rabbits obtained at the height of the breeding

season (February to July, 1941) in Caernarvonshire. Foetal mortality, as estimated by comparison of the number of corpora lutea with the number of healthy foetuses, was found to be very high, it being calculated from the stage of development of the embryo that between 42% and 56% of all litters were lost by resorption by the 20th day, the maximum period of loss being between the 11th and 12th day. (A table published by MINOT & TAYLOR in 1905 enables foetal age to be calculated fairly accurately.) In addition, 6·8% of the ova were lost in the remaining litters which survived the 20th day.

The period of maximum loss was 3–4 days after implantation had taken place and did not appear to coincide with any critical embryological change. It was earlier than the time of resorption noted by HAMMOND (1928), who traced the loss to a recessive Mendelian factor. Statistical analysis showed that the loss increased with litter-size, and possibly with other factors such as maternal body weight and whether or not the doe was lactating.—ALASTAIR N. WORDEN.

LANDAUER, W. (1940). **The Nature of Disproportionate Dwarfism, with Special Reference to Fowl.**—*Sigma XI Quart.* **28.** Reprint pp. 10.

Dwarfism in fowls may be a racial characteristic (*e.g.* bantam breeds), or it may be due to endocrine or nutritional disturbances. Some forms are hereditary and others are produced by environmental agencies.

Of the hereditary forms of dwarfism the so-called "Creeper" breed has been most extensively studied. Information obtained with this breed is discussed in detail.—F. D. ASPLIN.

—. (1942). **Activities of the Joint Committee on Foods.**—*J. Amer. vet. med. Ass.* **100.** 90–91.

A description of the work of the joint committee of the A.V.M.A. and the American Animal Hospital Association on the examination of commercial dog foods. Manufacturers are allowed to display a label of approval by the committee on their products, after they have been tested and found good.—J. E.

—. (1942). **Survey on Dog Feeding: Part II.**—*J. Amer. vet. med. Ass.* **100.** 416–418.

An explanation is given of the complicated legal provisions relating to the manufacture and sale of commercial dog foods. A great deal of dog food is produced without legal or scientific supervision, hence the need for such supervision as has been provided by the committee referred to above [see preceding abst.]

—ALASTAIR N. WORDEN.

OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1942). **Thirty-Ninth Annual Report 1941-1942 of the Imperial Cancer Research Fund.** pp. 25. London: Royal College of Surgeons. [4to].

The director's report gives a brief summary of work carried out by the staff during the year, most of which has already been published. Experiments have been carried out on the "milk factor" described a few years ago by BITTNER, which this worker has recently considered to be a virus. Work in the Fund's laboratories has confirmed many of Bittner's findings, and experiments are in progress to determine whether the "milk factor" plays a part in the genesis of types of tumour other than mammary cancer in mice.

Other work referred to in the report includes:—a study of the effect of oestrin on the Golgi apparatus of cells and in producing uterine fibromyomas in g. pigs and rabbits; histological studies of the pars nervosa of the pituitary which may cause a drastic revision of generally accepted views of its functions; confirmation of DEELMAN's findings of 20 years ago that a healing wound provides a stimulus to tumour formation; the preparation of specially purified virus from two filtrable fowl tumours and the observation that it was inactivated by drying but could be protected by the addition of protein or by hydrocyanic acid, the latter being of value because it is non-antigenic and thus enabled a study to be made of the antigenic properties of purified virus.

—E. G. WHITE.

INDIA. (1942). **Annual Report of the Imperial Council of Agricultural Research 1940-41.** pp. ii+190. Delhi: Manager of Publications. [8vo] [Rs. 2–12 or 4s. 6d.]

The section of the report dealing with animal pests and diseases shows that the following diseases were studied by the veterinary investigation officers in the several provinces and in Hyderabad and Mysore states.

Cattle Diseases.—Haemorrhagic septicaemia, anthrax, blackleg, Johne's disease, tuberculosis, mastitis, surra, fluorosis, enzootic haematuria, rinderpest, nasal granuloma, theileriasis, hump sore, piroplasmosis, lymphangitis, "bisi", liver fluke disease, horn cancer, retention of urine, parotiditis, enzootic otorrhoea in buffaloes, necrosis of the horn, coccidiosis, rhinosporidiosis, dermorrhagia, "kanthsar", pleuro-pneumonia infectious lymphangitis, microfilariasis, otacariasis in buffaloes, warts, gangrene of the tail, encephalomyelitis, tick infestation, and grass poisoning.

Equine Diseases.—Surra, kumri, and encephalomyelitis.

Sheep and Goat Diseases.—Contagious caprine pleuro-pneumonia, anthrax, rinderpest, circling disease, entero-toxaemia, Johne's disease, encephalomyelitis, pox, mange in goats, parasitic diarrhoea, nasal granuloma, abortion due to *Brucella melitensis*, ecthyma in goats, "wah", "pitto", gangrenous mastitis, hepatitis, fluorosis, tick infestation, and plant poisoning.

Fowl Diseases.—Newcastle disease, fowl pox, louse infestation, scaly legs, coccidiosis, bacillary white diarrhoea, and deficiency diseases.

Miscellaneous.—Feline haemorrhagic septicaemia, coccidiosis in dogs, and anthrax in a dog.

In many cases, experimental work was carried out in collaboration with the Imperial Veterinary Institute, Mukteswar and Izatnagar.

The Council notes with alarm the spread of TUBERCULOSIS and JOHNE'S DISEASE among cattle in India. A research officer on these two diseases, to be attached to the Imperial Veterinary Research Institute, had been sent to England for training. In Mysore, an epizoological survey was undertaken to assess the incidence of Johne's disease in the state and a considerable percentage of cattle and some sheep were found to be infected. Johnin is superior to avian tuberculin as a diagnostic agent.

The Council's scheme for estimating the extent of CONTAGIOUS ABORTION in India was inaugurated. An extensive tour of infected areas was undertaken to determine the incidence of abortion, and of premature births and STERILITY. The preparation of antigens and the instruction of field workers in their use according to a standard routine are in progress; certain relationships of BRUCELLOSIS to public health are also being studied.

Therapeutic trials on bovine THEILERIASIS continue; six animals recovered after treatment with sulphanilamide. Comparative efficacy tests in the treatment of SURRA showed that two new trypanocidal drugs

(moranyl and antrypol) are as effective as naganol. A systematic survey has been begun on the protozoal fauna of the alimentary tract of animals in India.

Ox-warble fly surveys in Bengal, Madras, and Sind have shown the inimical effect of excessive soil moisture on the development of *Hypoderma lineatum*. Goat warble-fly surveys have shown that *H. crossii* is limited to the North-West Frontier Province, the Salt Range area of the Punjab, Northern Sind, Baluchistan, and Kashmir and Kulu valleys. The breeds of goats infested are characterized by short stature, drooping ears, long hair, and long horns. Control of warbles was tried by two dressing methods, *viz*, (1) tobacco, lime and water, and (2) derris powder and water.

The Bombay tick control scheme showed that arsenic solution cannot be used without care in India, in the strength advised in colder countries.

A report on the enquiry into indigenous systems of veterinary medicine has been published, while a study of the toxicology and therapeutics of indigenous drugs was continued in Madras. In three provinces, helminthic surveys are in progress.—L. H. SHIRLAW.

INDIA, BOMBAY. (1939). **Annual Administration Report of the Civil Veterinary Department, Province of Bombay including the Bombay Veterinary College and the Bombay City and Harbour Veterinary Department, for the year 1938-39.** [FARBROTHER, E. S., & DEEN, M. M.] pp. 74. 13 tables. Bombay: Supt. Govt. Printing & Stationery. [8vo]. [Annas 4 or 5d.].

INDIA, CENTRAL PROVINCES and BERAR. (1940). **Annual Report of the Working of the Civil Veterinary Department of the Central Provinces and Berar for the Year Ending 31st March 1939.** [MCDOUGALL, J. C.] pp. 30. Nagpur: Govt. Printer. [8vo].

INDIA, MADRAS. (1938). **Annual Administration Report of the Madras Civil Veterinary Department for the year 1937-38.** [SAUNDERS, P. T.] pp. ii+64. 1 map. 5 appendixes. Madras: Supt. Govt. Press. [8vo].

INDIA, MADRAS. (1939). **Annual Administration Report of the Madras Civil Veterinary Department for the year 1938-39.** [SAUNDERS, P. T.] pp. iv+92. 11 tables, 1 map. Madras: Supt. Govt. Press. [8vo] [12 annas].

INDIA, ORISSA. (1940). **Annual Report of the Civil Veterinary Department, Orissa, for the year 1938-39.** [MOZUMDAR]. pp. 16+xxxiii. 2 appendixes. Cuttack, Orissa: Govt. Press. [8vo].

*INDIA, SIND. (1939). **Annual Administrative Report of the Civil Veterinary Department, Sind, for the year 1938-39.** [JERROM]. pp. 22. Karachi: Govt. Press. [8vo].

I	II	III	IV Cattle Diseases (no. of deaths)					
Department	Total Veterinary Staff	Budget (in rupees)	Rinderpest	Haemorrhagic Septicaemia	Foot & Mouth Disease	Blackleg	Anthrax	Surra
Bombay, 1938–39...	157	5,48,768	862	1,662	302	4,475	709	139
Central Provinces & Berar, 1938-39.	162	4,55,129	7,313	6,450	503	1,904	677	131
Madras, 1937–38 ...	345	11,11,946	7,983	5,670	2,358	11,189	3,282	Not give
Madras, 1938–39 ...	342	12,85,293	8,648	3,801	610	9,554	2,107	1,172
Orissa, 1938–39 ...	41	1,01,264	2,440	482	48	9	38	—
Sind, 1938–39 ...	35(?)	1,71,274	509	82	133	—	5	Not give

TABLE I

* The three figures for each disease in section V repres

ADDITIONAL NOTES (See also Table I)

BOMBAY

Special Investigations.—NAIK continued investigations into the causation of diseases of unknown origin, into methods of control of TICK INFESTATION and upon diseases of sheep, goats, and poultry, protozoan diseases of cattle, TUBERCULOSIS, and JOHNE'S DISEASE.

Education (M. MOHEY DEEN).—Of 138 students at the Bombay Veterinary College, 12 graduated during the year.

CENTRAL PROVINCES AND BERAR

Special Investigations (Veterinary Investigation Officer, BACHAN SINGH).—Investigations into protozoan and bacterial diseases, chronic inflammation of the parotid and submaxillary salivary glands, deficiency diseases, and diseases of goats, sheep, and poultry were carried out.

Quarantine.—To enforce the Central Provinces Cattle Diseases Act of 1934, nine quarantine stations were opened. Between December 1st, 1938 and March 31st, 1939, 41,499 cattle passed through these stations and of these 41,315 were vaccinated against RINDERPEST.

MADRAS (1937–38)

Special Investigations (Veterinary Investigation Officer, G. R. VISVANATHAN).—Diseases studied included CONTAGIOUS PLEURO-PNEUMONIA of goats, RINDERPEST in sheep, CIRCLING DISEASE in sheep, SHEEP POX, CONTAGIOUS ECTHYMA in goats, INFECTIOUS PNEUMONIA of sheep, and certain HELMINTHIC INFESTATIONS.

A vaccine against HAEMORRHAGIC SEPTICAEMIA to be used in outbreaks was introduced with satisfactory results.

Attempts were made during the year to determine the relative susceptibility of cattle and buffaloes in different districts to RINDERPEST, as shown by their response to an infection with goat-blood virus alone. A solid immunity was conferred by this method. It was found that the immunity conferred upon animals by the glycerinated spleen-tissue vaccine was weak and liable to disappear within a few months.

An estimation was made of the economic loss to the province resulting from FOOT AND MOUTH DISEASE. Affected animals were treated with soda ash and chloride of lime with good results.

FLUOROSIS occurred in cattle in one area, the source being fluorides in the drinking water.

Tapeworms of the species *Pseudanoplocephala crawfordi* Baylis, 1927, were for the first time recorded in pigs in India.

Education (SIR M. R. V. PANIKKAR).—There were 118 students in the Madras Veterinary College; 17 students were successful in the B.V.Sc. preliminary examination and 19 others secured diplomas.

Serum Institute.—Over a million doses of vaccines

V Preventive Inoculation of Bovines				VI Veterinary Work				
				Hospitals & Dispensaries				
Rinderpest	Haemorrhagic Septicaemia	Blackleg	Anthrax	No. of Hospitals	No. of Dispensaries	Treatments including Supply of Medicines	Treatments on Tour	Castrations
1,306*	36,941	—	2,336					
43,934*	3,891	39,467	184	120		356,477	79,399	52,470
1,983*	—	—	—					
7,001	5,798	2,860	6,020					
295,222	5,410	52,563	9,097	106		278,904	366,950	100,774
1,434	205,784	1,460	—					
224	137,731	97,039	10,799					
116,127	11,815	134,828	—	111		262,674	128,981	83,202
180,140	—	8,863	—					
210	28,548	28,907	7,638					
129,271	98,905	191,460	—	115		282,005	148,013	93,400
240,724	20	2,712	—					
2,234	1,779	—	2,023					
192,020	4,678	977	—	6	57	71,545	96,804	29,378
1,102	—	1,020	—					
—	744	—	16					
10,469	—	—	—	—	24	37,411	114,057	3,253
—	—	—	—					

serum alone inoculation, (2) vaccine inoculation, and (3) serum-virus inoculation.

and sera manufactured by the Institute were issued during the year and the preparation of HAEMORRHAGIC SEPTICAEMIA vaccine was inaugurated.

Statistics.—The revised system of registering mortality and reporting outbreaks was in force in an attempt to furnish more accurate data on these points.

MADRAS (1938–39)

Special Investigations (Veterinary Investigation Officer, G. R. VISVANATHAN).—The following diseases were added to the list of those on which investigations as to incidence were being carried out :– ANTHRAXS HAEMORRHAGIC SEPTICAEMIA, BOVINE CONTAGIOUS ABORTION, BLACKLEG, TRYPANOSOMIASIS, PARASITIC INFESTATION in sheep, FOOT AND MOUTH DISEASE, ENTEROTOXAEMIA, and OSTEOMALACIA.

Evidence was produced in the Madras Veterinary College laboratory that protection against CONTAGIOUS PLEURO-PNEUMONIA of goats can be effected by both serum and vaccine.

The use of sterilized bone meal was reported to have given beneficial effect amongst animals affected with chronic FLUOROSIS.

Education (SIR M. R. V. PANIKKAR).—The number of students in the Madras Veterinary College was 126; of these 29 graduated and 15 passed the B.V.Sc. intermediate examination. With effect from this year, the G.M.V.C. course has been extended to four years and the B.V.Sc. course to five years.

Serum Institute.—The routine manufacture was continued of rinderpest antiserum, haemorrhagic septicaemia antiserum and vaccine, rinderpest bull virus, rinderpest goat virus and rinderpest (glycerinated) goat-spleen tissue vaccine.

Livestock.—The most important event of the year was the transfer of cattle-breeding operations from the Agricultural Department to this Department and a comprehensive scheme for the development of this section has been drawn up.

ORISSA

Special Investigations (Veterinary Investigation Officer, P. S. KUPPUSWAMI).—Diseases studied included

I	II	III	IV Cattle Diseases (no. of deaths)						
Department	Total Veterinary Staff	Budget (in rupees)	Rinderpest	Haemorrhagic Septicaemia	Foot & Mouth Disease	Blackleg	Anthrax	Surra	Other Contagious & Parasitic Diseases
Assam, 1940–41 ...	112	2,34,698	8,654	1,553	364	90	1,222	—	6,687
Bombay, 1940–41 ...	160	6,34,026	1,580	1,201	167	2,764	417	30	128
Central Provinces & Berar, 1940–41	163	4,50,955	4,588	2,519	444	356	392	90	708
Madras, 1940–41 ...	380	12,00,571	13,137	2,813	761	4,310	2,071	256	3,994
North-West Frontier Province, 1940–41	125	2,89,834	171	522	8,354	57	—	—	206
Orissa, 1940–41 ...	77	1,23,241	3,430	577	290	68	20	17	273
Sind, 1940–41 ...	37	1,53,041	105	80	25	—	—	—	758
United Provinces, 1940–41	403†	5,29,248	6,701	2,644	363	463	349	15	195

TABLE II

* The three figures for each disease in section V represent (1) serum alone inoculati

TUBERCULOSIS, poultry diseases and deficiency diseases.

SIND

Special Investigations (Veterinary Investigation Officer, H. S. BAWA).—Investigations were carried out on WARBLE FLY INFESTATION and CUTANEOUS HAEMORRHAGE of cattle, and also on RINDERPEST, CONTAGIOUS PLEURO-PNEUMONIA, and the disease known as "WAH" in sheep and goats.—L. H. SHIRLAW.

INDIA, AJMER-MERWARA. (1940). **Annual Administration Report of the Civil Veterinary Department in Ajmer-Merwara (British Rajputana) for the year 1939-40.** [JERROM]. pp. 16. [8vo].

INDIA, ASSAM. (1941). **Annual Report of the Civil Veterinary Department, Assam, for the Year 1939-40.** [GHOSE, S. C.] pp. 53+2. [8vo] [Annas 14 or 1s. 4d.]

INDIA, BALUCHISTAN. (1941). **Administration Report of the Baluchistan Agency for the Year 1st April 1939 to the 31st March 1940.** Items of veterinary interest pp. 115–123. Delhi: Manager of Publications. [8vo] [Rs. 3. As. 6] [5s. 6d.]

INDIA, BENGAL. (1941). **Annual Report of the Civil Veterinary Department, Bengal, and of the Bengal Veterinary College for the year 1939-40.** [ALI, S. M., & MACGREGOR, A. D.] pp. 71. Bengal: Supt. Govt. Printing. [8vo] [Annas 5; 7d.]

INDIA, BIHAR. (1941). **Annual Report of the Civil Veterinary Department, Bihar, for the Year 1939-40.** pp. 30+1+3. Patna: Supt. Govt. Printing. [8vo] [Rs. 1–2–0].

INDIA, BOMBAY. (1940). **Annual Administration Report of the Civil Veterinary Department, Bombay Province including the Bombay Veterinary College and the Bombay City and Harbour Veterinary Department, 1939-40.** [FARBROTHER, E. S., & DEEN, M. M.] pp. 75. 6 tables. Bombay: Govt. Printing & Stationery. [8vo] [Annas 5 or 6d.]

INDIA, CENTRAL PROVINCES & BERAR. (1941). **Annual Report on the Working of the Civil Veterinary Department in the Central Provinces and Berar for the Year Ending the 31st March 1940.** [MCDOUGALL, J. C.] pp. 26. Nagpur: Govt. Printer. [8vo] [Annas 8].

V Preventive Inoculation of Bovines				VI Veterinary Work					VII Slaughtering	
				Hospitals & Dispensaries						
Rinderpest	Haemorrhagic Septicaemia	Blackleg	Anthrax	No. of Hospitals	No. of Dispensaries	Treatments including Supply of Medicines	Treatments on Tour	Castrations	No. of Slaughter Houses (approved)	No. of Animals Slaughtered
81*	1,078	260	1,780							
0,450*	—	—	—	3	Not given	8,629	303,782	37,364	65	67,048
2,871*	—	—	—							
405	15,478	—	687							
30,024	28,587	35,982	550	121		285,283	104,430	59,310	Not given	Not given
1,591	57	—	—							
2,361	727	15	8,163							
8,904	172,425	21,301	—	—	105	333,560	322,460	107,464	126	296,862
5,837	443	457	—							
645	7,237	5,470	6,766							
4,233	148,299	115,050	—	119		301,674	151,721	106,946	218	2,061,113
8,702	—	—	—							
—	—	—	—							
5,292	22,677	9,186	—	76		372,048	118,119	114,259	40	254,180
—	—	—	—							
9,151	5,004	1,644	1,405							
1,173	3,713	807	—	6	61	65,115	94,034	39,954	27	96,834
6,611	—	—	—							
—	659	—	—							
4,894	—	—	—	27		54,128	74,935	6,315	41	604,090
—	—	—	—							
2,368	94,391	7,346	5,715							
6,161	115,027	—	200	194		717,109	129,093	180,205	239	1,316,016
1,751	1,751	—	—							

vaccine inoculation, and (3) serum-virus inoculation. † Including stockmen.

INDIA, HYDERABAD-DECCAN. (1941). **Annual Administration Report of the Civil Veterinary Department H.E.H. the Nizam's Government for the Year 1349 Fasli (7th October 1939 to 5th October 1940).** [BADAMI, B. K.] pp. 65. 2 appendixes. Hyderabad-Deccan: Govt. Central Press. [8vo].

*INDIA, MADRAS. (1940). **Annual Administration Report of the Madras Civil Veterinary Department for the Year 1939-40.** [HURLEY, T. J.] pp. 97. Madras: Govt. Press. [8vo]. [12 Annas].

*INDIA, MYSORE. (1941). **Review on the Annual Report of the Civil Veterinary and Live Stock and Amrit Mahal Department for the year 1939-40 with the Government Review thereon.** [ACHAR, S. D.] pp. 101, 9 appendixes. [Folio].

*INDIA, MYSORE. (1941). **Administrative Report of the Mysore Serum Institute for the year 1939-40 with the Government Review thereon.** [ACHAR, S. D.] pp. 55. 15 appendixes. [Folio].

INDIA, NORTH-WEST FRONTIER PROVINCE. (1940). **Report on the Civil Veterinary Department, North-West Frontier Province for the year 1939-40.** [SARWAR]. pp. 21+xxviii. Peshawar: Govt. Stat. & Printing. [8vo].

INDIA, ORISSA. (1941). **Annual Report of the Civil Veterinary Department, Orissa, for the year 1939-40.** [SOLOMON]. pp. 17+xxxiii. 2 appendixes. Cuttack: Govt. Press.

INDIA, PUNJAB. (1941). **Annual Report of the Civil Veterinary Department, Punjab, for the year 1939-40.** [WALKER]. pp. 49+xl. Lahore: Govt. Printing. [8vo].

*INDIA, SIND. (1941). **Annual Administration Report of the Civil Veterinary Department, Sind, for the year 1939-40.** [JERROM]. pp. 22. Karachi: Govt. Press. [8vo].

INDIA, UNITED PROVINCES. (1940). **Annual Report of the Civil Veterinary Department, United Provinces for the year 1939-40.** [EGAN, T. J.] pp. iii+42. Allahabad: Supt., Printing and Stationery. [8vo] [6 Annas].

ADDITIONAL NOTES (See also Table II)

AJMER-MERWARA

Special Investigations (Veterinary Investigation Officer, H. S. BAWA).—Investigations were carried out on CONTAGIOUS ABORTION in goats and sheep, on SHEEP POX and SCAB in goats, and on RINDERPEST.

ASSAM

Special Investigations (Veterinary Investigation Officer, V. R. GOPALKRISHAN).—The following diseases were investigated :– bovine abortion, mastitis, Johne's disease, theileriasis, surra, kumri in horses, rinderpest, bovine infectious lymphangitis, goat pox, ecthyma in goats, bovine pleuro-pneumonia, helminthiasis, micro-filariasis in cattle, otacariasis in buffaloes, warts, gangrene of the tail, " grass poisoning " in cattle, and diseases of poultry.

Other provincial officers established that there appears to be a close pathological relationship between KUMRI and EQUINE ENCEPHALOMYELITIS, and that hormone treatment with detoxicated urine from pregnant cows in doses of 10 ml. per 100 lb. body weight given subcutaneously is effective against STERILITY and slow breeding.

BENGAL

Special Investigation (Veterinary Investigation Officer, BALWANT SINGH).—Among the diseases studied were ANTHRAX, PIROPLASMOSIS, RINDERPEST, and HUMP SORE. Treatment of hump sore by the simultaneous application of tartar emetic ointment and of antimosan subcutaneously was promising. Some of the cattle immunized against rinderpest by the serum-vaccine method were immune after three years.

Education (A. D. MACGREGGOR).—There were 216 students in the college at the beginning of the year, 44 of whom graduated.

BIHAR

Special Investigations (Veterinary Investigation Officer, H. R. KAPOOR).—Special items of investigation were :– MASTITIS, EQUINE ENCEPHALOMYELITIS, HORN CANCER, and sheep, goat, and fowl diseases. ENZOOTIC OTORRHOEA (buffalo), suspected to be a cutaneous micro-filariasis of the ear, was found to be common in well irrigated districts, while age appeared to be a limiting factor in its incidence; the disease seemed to be of seasonal occurrence (March-June). Urine retention was common in paddy-growing areas. In the laboratory, antimosan gave good results in canine FILARIASIS.

Education (M. I. MALIK).—There were 126 students in the college, 17 of whom graduated.

CENTRAL PROVINCES AND BERAR

Special Investigations (Veterinary Investigation Officer, BACHAN SINGH).—Important findings were the detection of RHINOSPORIDIOSIS in a cow, *Brucella melitensis* INFECTION in a goat as the cause of abortion, and a deficiency disease resembling RICKETS in a fowl. The pathogenicity of *Eimeria smithi*, a new variety of coccidium, was established in a number of cases in cattle and buffaloes.

HYDERABAD-DECCAN

Special Investigation (Veterinary Investigation Officer, M. R. MAHAJAN).—" Hexamine " was stated to be effective in the early stages of EQUINE ENCEPHALOMYELITIS.

MADRAS

Special Investigations (Veterinary Investigation Officer, G. R. VISVANATHAN).—BRUCELLOSIS, JAUNDICE in lambs, *Oestrus ovis* INFESTATION, and PLANT POISONING were added to the diseases under investigation.

Research work in the college pathological laboratory on CONTAGIOUS PLEURO-PNEUMONIA of goats, in progress since July 1938, was completed during the year and a report submitted to Government.

Extensive trials with desiccated goat-spleen tissue vaccine against RINDERPEST proved its ability to immunize adult buffaloes and to produce a milder reaction than the vaccines previously used. The goat-spleen tissue was viable in the cold for 45 days.

Education (SIR M. R. V. PANIKKAR).—Out of 128 students in the college, 24 secured diplomas, and seven passed the final (old regulation) B.V.Sc., examination.

Serum Institute.—In addition to routine manufacture of vaccines and sera, experiments were begun on the preparation of BLACKLEG vaccine with the strains available.

MYSORE

Special Investigations (Veterinary Research Officer, P. M. NAIDU).—Investigations were carried out into abortions among stud mares, anthrax in sheep and goats, rabeis in horses, contagious pleuro-pneumonia in goats, distemper and uncinariasis of dogs, " grass tetany ", and poultry diseases. Extensive field trials with anti-rabic vaccine, fowl-pox vaccine, and anthrax saponin vaccine gave good results.

Work carried out by other veterinary officers included an investigation into an outbreak of " FRAGILITIS OSSEUM ". As a result of epizoological surveys, JOHNE'S DISEASE was found to be more widespread both among imported and indigenous breeds of cattle than was formerly suspected. The superiority of johnin over avian tuberculin for diagnosis was demonstrated.

Serum Institute.—619,478 doses of various sera and vaccines were supplied to the Mysore Civil Veterinary Department and to places outside the State. The most outstanding work was the development of vaccines against RABIES in dogs, and ANTHRAX in sheep, goats, and cattle.

ORISSA

Special Investigations (Veterinary Investigation Officer, P. S. KUPPUSWAMI).—A high incidence (13·5%) of TUBERCULOSIS amongst conservancy bullocks in the Puri municipality was revealed. It was confirmed in the laboratory that 90 cattle dying in one village, were affected with ENCEPHALOMYELITIS.

PUNJAB

Special Investigation (Veterinary Investigation Officer, W. M. KHAN).—Tuberculin tests were carried out on 1,154 animals and 19 were positive. An unknown disease among sheep at the Government cattle farm, Hissar, was diagnosed as ENCEPHALOMYELITIS. Small-scale experiments in the treatment and control of SHEEP POX by a sensitized vaccine (BRIDRE & BOQUET) were encouraging. At Hissar, experiments showed that liberal feeding has a marked effect in lowering the mortality and increasing the birth rate in cattle.

Education (J. S. GAREWAL).—Out of 254 students at the college, 33 graduated during the year.

SIND

Special Investigations (Veterinary Investigation Officer, H. S. BAWA).—Investigations carried out included work on "WAH" (CONTAGIOUS ARTHRITIS), CONTAGIOUS ABORTION, gangrenous contagious MASTITIS, and CONTAGIOUS PLEURO-PNEUMONIA of goats.

UNITED PROVINCES

Special Investigations (Veterinary Investigation Officer, P. G. PANDEY).—Special attention was given to the scarification method of vaccinating cattle and buffaloes against RINDERPEST. "BISI", a disease prevalent in domesticated ruminants, proved to be a helminthic condition caused by immature paramphistomes. Investigations were carried out on SURRA in equines and bovines, on sheep and goat diseases, on NEWCASTLE DISEASE in fowls, and FODDER POISONING in cattle.—L. H. SHIRLAW.

INDIA, ASSAM. (1942). **Annual Report of the Civil Veterinary Department, Assam, for the year 1940-41.** [GHOSE, S. C.] pp. 43+2. Shillong: Assam Govt. Press. [8vo] [Annas 12 or 1s. 2d.]

INDIA, BOMBAY. (1941). **Annual Administration Report of the Civil Veterinary Department, Bombay Province, including the Bombay Veterinary College and the Bombay City and Harbour Veterinary Department for the Year 1940-41.** [FARBROTHER, E. S., & DEEN, M.] pp. 74. Bombay: Govt. Central Press. [8vo] [Annas 5 or 6d.]

INDIA, CENTRAL PROVINCES and BERAR. (1941). **Annual Report on the Working of the Civil Veterinary Department of the Central Provinces & Berar for the Year ending the 31st March 1941.** [SHAHI]. pp. 34. Nagpur: Govt. Printing. [8vo] [12 Annas].

INDIA, MADRAS. (1941). **Annual Administration Report of the Madras Civil Veterinary Department for the year 1940-41.** [HURLEY, T. J.] pp. iv+85+2. Madras: Supt. Govt. Press. [8vo] [12 Annas].

INDIA, NORTH-WEST FRONTIER PROVINCE. (1941). **Report on the Civil Veterinary Department, North-West Frontier Province for the year 1940-41.** [SARWAR]. pp. 21+xxv. Peshawar: Govt. Stat. & Printing. [8vo].

INDIA, ORISSA. (1942). **Annual Report of the Civil Veterinary Department, Orissa, for the Year 1940-41.** [AZFAR, M.] pp. iii+20+xxxiii+2. 2 appendixes. Cuttack, Orissa: Supt. Govt. Press. [8vo] [Rs. 2–6–0].

INDIA, SIND. (1942). **Annual Administration Report of the Civil Veterinary Department, Sind, for the Year 1940-41.** [JERROM, J. H. G.] pp. 24. Karachi: Govt. Press. [8vo] [As. 4].

INDIA, UNITED PROVINCES. (1941). **Annual Administration Report of the Civil Veterinary Department for the year 1940-41.** [EGAN, T. J.] pp. iii+27. Allahabad: Supt. Printing and Stationery. [8vo] [0.3.6].

ADDITIONAL NOTES (See also Table III)

ASSAM

Special Investigations (Veterinary Investigation Officer, V. R. GOPALAKRISHAN).—In addition to its usual activities, the department carried out research on JOHNE'S DISEASE, SALMONELLA INFECTION in pigeons, BOVINE CONTAGIOUS PLEURO-PNEUMONIA, KUMRI in horses, chemotherapy of HUMP SORE (stephanofilariasis), HELMINTHIASIS in calves in relation to its seasonal incidence under controlled and open field conditions, and "EAR SORE" in buffaloes (filariasis). Curative treatment of bovine pleuro-pneumonia with novarsenobillon intravenously gave promising results.

BOMBAY

Education (M. MOHEY DEEN).—There were 138 students in the college at the beginning of the year, 28 of whom graduated.

CENTRAL PROVINCES AND BERAR

Special Investigations (Veterinary Investigation Officer, BACHAN SINGH).—A number of interesting conditions including RHINOSPORIDIOSIS, GOAT POX, and *Babesia motasi* INFECTION in goats were investigated. BRUCELLA INFECTION in cattle is prevalent. Further study of COCCIDIOSIS in cattle has established the pathogenicity of *Eimeria smithi* and its prevalence in the province. ENCEPHALOMYELITIS in cattle, buffaloes, and young lambs was noted for the first time. An interesting pathological condition in bullocks, appearing as large cutaneous lesions on the neck, flank, and prepuce was suspected to be due to filariae. NEWCASTLE DISEASE was responsible for a high mortality in poultry, while ROUP was recorded for the first time.

MADRAS

Special Investigations (Veterinary Investigation Officer, G. R. VISWANATHAN).—Statistics regarding the incidence of HAEMORRHAGIC SEPTICAEMIA were collected from all districts. Investigations into the incidence of BRUCELLOSIS were conducted in 53 villages; of 802 samples of sera, 118 were positive and 70 suspicious on agglutination tests. Bovine CONTAGIOUS ABORTION has a comparatively heavy incidence in the foothills while the "plains" areas and city suburbs are relatively free. Curative treatment of chronic rheumatic ARTHRITIS with sterilized bone meal and blood fibrin was satisfactory. Prophylactic vaccination with formalized vaccine reduced the mortality from and controlled the spread of CAPRINE CONTAGIOUS PLEURO-PNEUMONIA; a minimum dose of 0·1 g. of either neosalvarsan or novarsenobillon in 20 ml. of distilled water given intravenously was effective for treatment. Strongyle ova can be found in field manure of about 70% of sheep and goats. In continuation of the helminths scheme of the Imperial Council of Agricultural Research, a study of the life-history of *Oesophagostomum radiatum* was completed and further information collected regarding *Ascaris vitulorum* and *Moniezia* INFESTATIONS. The Council's scheme for investigation into indigenous drugs with special reference to their toxicology, and that for investigation of diseases of poultry were inaugurated.

Education (SIR M. R. V. PANIKKAR).—Of 120 students in the college, 16 taking the three-years' course

I	II	III	IV Cattle Diseases (no. of deaths)					
Department	Total Veterinary Staff	Budget (in rupees)	Rinderpest	Haemorrhagic Septicaemia	Foot & Mouth Disease	Blackleg	Anthrax	Surra
Ajmer-Merwara, 1939–40	5†	9,357	9	—	—	—	19	—
Assam, 1939–40 ...	112	2,08,693	23,426	1,514	871	90	1,883	—
Baluchistan, 1939–40	13§	48,126	126	—	15	8	1	—
Bengal, 1939–40 ...	190	Not given	23,459	3,524	955	190	1,658	17
Bihar, 1939–40 ...	180†	7,21,911	4,300	3,029	51	490	428	98
Bombay, 1939–40 ...	160	6,20,022	1,135	1,533	159	4,239	662	187
Central Provinces & Berar, 1939–40	166	4,82,543	7,460	2,435	441	692	659	98
Hyderabad-Deccan, 1939–40	146	5,60,189	1,725	1,149	108	944	119	93
Madras, 1939–40 ...	370	12,30,210	9,847	2,886	869	4,351	2,212	255
Mysore, 1939–40 ...	113	Not given	1,294	537	349	3,044	2,096	Not giv
North-West Frontier Province, 1939–40	125	2,46,113	897	1,258	9,366	35	—	4
Orissa, 1939–40 ...	41	1,07,879	3,620	766	90	52	30	—
Punjab, 1939–40 ...	521	28,06,064	5,549	6,863	234	434	—	—
Sind, 1939–40 ...	36	1,69,168	471	348	363	6	—	—
United Provinces, 1939–40	244†	5,14,775	12,273	4,219	891	465	350	53

TABLE III

* The three figures for each disease in section V represent (1) serum alone inoculation, (2) vac

V Preventive Inoculation of Bovines				VI Veterinary Work					VII Slaughtering	
				Hospitals & Dispensaries						
Rinderpest	Haemorrhagic Septicaemia	Blackleg	Anthrax	No. of Hospitals	No. of Dispensaries	Treatments including Supply of Medicines	Treatments on Tour	Castrations	No. of Slaughter Houses (approved)	No. of Animals Slaughtered
— *	—	—	434							
323*	—	—	—	—	3	6,716	1,312	639	6	83,372
— *	—	—	—							
354	1,292	26	2,147							
5,084	—	—	36	3	—	8,251	169,049	33,997	50	61,796
300	—	—	—							
t given	Not given	Not given	Not given							
				—	10	56,308	47,485	654	—	118,542
7,900	11,858	247	13,368							
3,282	6,764	1,444	2,333	?	104	279,840	160,297	5,668	—	—
4,828	—	—	—							
0,216	70,015	5,196	9,879							
2,802	18,842	4,861	—	29	224(?)	134,153	329,606	124,581	31	518,955
—	—	—	—							
489	27,173	—	1,453							
4,955	10,251	57,611	231	120		260,440	69,302	41,098	139	1,927,610
844	—	—	—							
5,537	1,385	1,208	12,388							
2,951	158,548	28,169	—	—	118	298,797	347,767	105,135	129	240,367
6,968	1,130	216	—							
126	15,894	1,458	2,826							
0,838	9,636	—	—	Not given	Not given	363,063	57,581	44,089	97	774,852
8,393	29,014	4,714	—							
756	19,382	7,318	10,603							
2,031	115,905	119,818	—	118		279,892	152,450	100,695	169	1,525,122†
7,535	568	27	—							
43										
6,960	20,152	117,008	36,960	81		347,777	67,388	99,307	54	134,305
8,120										
7,812	47,078	1,941	5,255	73	163	356,758	91,052	107,020	40	282,081
4,410	2,910	1,289	999							
2,308	4,558	173	—	6	36	70,675	99,267	34,330	26	98,220
452	—	—	—							
0,710	463,911	6,090	200							
1,923	421,996	24,532	—	318	1,224	2,074,627	423,502	653,574	378	1,342,763
—	—	—	—							
—	2,233	—	—							
5,090	—	—	—	24		63,380	209,369	5,499	45	481,907
—	—	—	—							
9,454	116,456	7,254	8,598							
1,774	89,251	—	85	194		666,596	129,632	152,501	332	1,457,329
3,325	—	—	—							

culation, and (3) serum-virus inoculation. † Figure incomplete. § Number of veterinary assistant surgeons only given.

and 11 taking the four-years-course obtained diplomas, while nine students qualified as B.V.Sc. (old regulations), and 28 passed the intermediate examination in veterinary science.

Serum Institute.—Experiments on the manufacture of BLACKLEG vaccine were completed and the product released for field use. The manufacture of blackleg serum, FOWL-CHOLERA serum and vaccine, FOWL-POX vaccine, and BOVINE LYMPHANGITIS vaccine was also begun during the year.

NORTH-WEST FRONTIER PROVINCE

Special Investigations.—From small-scale experiments, it was found that hill cattle react more severely to goat-tissue virus than do plains cattle.

ORISSA

Special Investigations (Veterinary Investigation Officer, P. S. KUPPUSWAMY).—Out of 224 cattle submitted to the double intradermal tuberculin test there were nine positive and five doubtful reactors. Out of 223 cattle tested for JOHNE'S DISEASE, 38 were positive and seven doubtful. BOVINE ABORTION is enzootic in the province.

SIND

Special Investigations (Veterinary Investigation Officer, H. S. BAWA).—Investigations were continued on CONTAGIOUS ABORTION, CONTAGIOUS MASTITIS, "WAH", PLEURO-PNEUMONIA of goats, RINDERPEST, ENCEPHALOMYELITIS, and PLANT POISONING.

UNITED PROVINCES

Special Investigations (Veterinary Investigation Officer, P. G. PANDEY).—Further experiments on the scarification method of vaccination against RINDERPEST yielded results which appeared to justify its adoption in the field. Potassium antimony tartrate was found useful in the prevention and treatment of bovine SURRA.

—L. H. SHIRLAW.

INDIA. (1941). **Annual Report of the Imperial Veterinary Research Institute, Mukteswar and Izatnagar For the Year 1939-40.** [MINETT, F. C.] pp. 61. 5 appendixes. Delhi: Manager of Publications. [8vo] [Rs. 1 As. 10 or 2s. 6d.]

Personnel.—The superior staff numbered 28, the subordinate 140.

Finance.—The total income of the Institute amounted to Rs. 5,16,796 and the expenditure to Rs. 7,30,511, so that the net cost to the Government of India was Rs. 2,13,715.

Disease Investigation.—(a) CATTLE. Experiments with ANTHRAX spore vaccine indicated that a sub-infective dose of virulent spores is not rendered infective by vaccination. The special research officer on BOVINE CONTAGIOUS ABORTION visited the Punjab and United Provinces, finding an incidence of 2·5–5·0% in European and cross-bred cattle and of 1·0% in indigenous breeds. In buffaloes, the abortion rate is intermediate. There is reason to believe that the disease is specific and due to *Brucella*, and that brucella infection is frequently associated with temporary sterility of the animal. The incidence of TUBERCULOSIS in buffaloes is under special study. BOVINE MASTITIS has been shown to be nor uncommon in India and due to streptococci, as in othet countries. Further work on material sent from Assam has confirmed the existence of BOVINE CONTAGIOUS PLEURO-PNEUMONIA in that province. This is, of course, a very important development. A disease, diagnosed mainly on histological grounds as BOVINE ENCEPHALOMYELITIS, was reported from two Government farms. Experiments on the transmission of RINDERPEST by *Tabanus orientis* gave some positive results but the chances of its being a natural vector are considered remote.

(b) EQUINES. Evidence is accumulating that KUMRI is nothing more than chronic ENCEPHALOMYELITIS. Further evidence has been secured to indicate that the direct cause of some forms of OPHTHALMIA is a microfilaria. Work on EQUINE STERILITY has been carried out.

(c) GOATS. At least three types of PNEUMONIA have been differentiated :– (1) a specific form probably due to a virus, (2) a suppurative type due to corynebacteria, and (3) an acute type apparently due to pasteurella. In addition, there are pneumonias due directly to helminth parasites. Other diseases, "WAH" (swelling of joints and mastitis) and POX, as well as helminthic infestations, were also studied; "GILLAR", an anaerobic condition which occurs in goats, probably falls in the latter class.

(d) POULTRY. Experiments to ascertain whether species of ticks other than *Argas persicus* can transmit *Spirochaeta anserina* were negative.

Protozoology.—The SURRA trypanosome was proved to be incapable of passing from an infected mare to the foetus. Two species of *Babesia* other than *B. bigemina* have been shown to cause disease. As these are not susceptible to trypan blue, the failure to cure certain cases in the field by this drug may be explained. The differentiation of the various species of coccidia which infest Indian fowls and studies on their life-histories are now being undertaken.

In the helminthology sub-section, several parasites new to science have been described in fishes and birds, as well as a new fluke apparently quite common in goats and cattle in India.

Animal Nutrition.—The work of the section is described. Animal nutrition surveys in villages have been initiated. "FITS" in cattle were found to be due to the feeding of oat bhoosa (chaff). The problem of the relation of vitamin C metabolism to disease is now under investigation.

Poultry Research.—Breeding experiments with imported and native breeds have now reached the second generation. The latter show a lower growth rate and earlier maturity. In egg production the native breeds equalled the Leghorns but were inferior to the Rhode Island Reds. Food consumption and mortality was considerably lower among the pullets of native breeds.

Production.—4,221,173 doses of sera and other products were prepared during the year and 3,122,422 doses were issued to the field. In view of the possibility that, owing to the war, the Institute might be asked to prepare toxoid and serum for TETANUS, some preliminary experiments were carried out and this section is now in a position to prepare these products if required by the military authorities in India.

Education.—Two more post-graduate courses have been added to the curriculum, one in advanced animal husbandry and one in poultry husbandry.

—L. H. SHIRLAW.

INDIA. (1942). **Annual Report of the Imperial Veterinary Research Institute, Mukteswar and Izatnagar For the year 1940-41.** [MINETT, F. C.] pp. 69. 5 appendixes. Delhi: Manager of Publications. [8vo] [Re. 1 annas 14 or 2s. 9d.]

Personnel.—The superior staff numbered 33, the subordinate 147.

Finance.—The total income amounted to Rs. 3,98,667 and the expenditure to Rs. 7,65,025, the net cost to Government being Rs. 3,66,758.

Disease Investigation.—(a) CATTLE. An all-India BOVINE CONTAGIOUS ABORTION survey has shown that the incidence of this disease in bovines varies considerably in different areas, although sterility in cattle is as prevalent in India as elsewhere. The blood test for

abortion has been standardized. It has been established that the progeny of ticks from calves infected with acute THEILERIASIS can only transmit the disease in the adult stage, which fact differentiates these ticks from the parasites responsible for the transmission of EAST COAST FEVER. The virus of BOVINE CONT. PLEURO-PNEUMONIA has been isolated from material sent from Assam and passaged in experimental hill bulls. Attempts to protect animals against this disease have met with considerable success. Comparative studies between Indian virus strains and strains received from Kenya and Australia are in progress.

(b) EQUINES. Strains of the virus from two cases of ENCEPHALOMYELITIS have been successfully isolated and passaged.

(c) GOATS. Efforts to classify the various diseases of goats in India have led to the establishment of the existence of two diseases new to this country: one, due to a filtrable virus, is similar to, but not the same as, GOAT POX; the nature of the other, a disease of the udder, remains to be elucidated.

(d) POULTRY. A new formolized vaccine against NEWCASTLE DISEASE has been elaborated, but it remains under experimental trial.

Zoology.—A number of protozoa, some new to science, others new to India, have been identified in various host species. It has been shown that the causative organism of HAEMORRHAGIC SEPTICAEMIA can be disseminated among laboratory rabbits by fleas. The possibility of a mycotic origin of HAEMATURIA is being investigated.

Animal Nutrition.—The work of the section is described. "Fits" in calves were shown to be due to hypomagnesaemia.

Poultry Research.—The value of egg supplements to deficient human diets has been unmistakably proved in experimental rats. The grading-up of indigenous breeds of fowls by proper selection was shown to be possible. Much useful information regarding egg quality is being accumulated. Stock from the Institute farm is being transferred to village areas in order to obtain information regarding the behaviour of various types of birds under strictly village conditions. Efforts to overcome certain difficulties inherent in the anatomy of the fowl have been made as a prelude to initiating digestibility trials.

General Research.—A comprehensive investigation has been started on the influence of climatic factors upon animal diseases in India.

Production.—4,089,415 doses of sera and other products were manufactured during the year and 2,676,978 doses were issued to the field.—L. H. S.

AUSTRALIA. (1940). **Fourteenth Annual Report of the Council for Scientific and Industrial Research, for year 1939-40.** Items of veterinary interest pp. 18–20 and 25–41. Canberra: Govt. Printer. [fcp] [4s. 3d.]

Bacterial Diseases

TUBERCULOSIS.—A complement-fixation test, with an antigen derived from human type tubercle bacilli, defatted, disintegrated in a ball mill, and extracted by boiling in distilled water, was of value in detecting advanced cases in cattle which no longer reacted to the tuberculin test. The antigen is unfortunately relatively labile.

ENTEROTOXAEMIA OF SHEEP.—The causal organism, *Clostridium welchii*, Type D, produces an additional toxic component (ϵ-component) which is absorbed from the gut. Pharmacological studies of the toxin showed that it has a direct action on the central nervous system, probably on the basal motor ganglia in the brain; it also liberates histamine from the lungs, leading to pulmonary oedema, and adenyl compounds from the heart, producing a disturbance of conduction.

"BLACK DISEASE".—The antigenic analysis of strains of *Cl. novyi* (*Cl. oedematiens*) from many sources was completed. Most strains show the presence of "O" antigen; it therefore appears unnecessary to make anacultures polyvalent.

CASEOUS LYMPHADENITIS.—A vaccine prepared from bacteria disrupted by freezing and thawing gives a substantially better degree of protection than any others tested to date. Chemical studies on the polysaccharide antigen were continued.

Protozoan Diseases

ANAPLASMOSIS.—Transmission by winged insects appears to be of exceptional occurrence and of little practical importance.

Virus Diseases

EPHEMERAL FEVER.—A c.-f. test for cattle was devised. The antigen, though specific and sensitive, is relatively labile. It was prepared by disrupting in distilled water suspensions of leucocytes and blood platelets from infected cattle, then boiling the suspensions and making them isotonic with sodium chloride.

INFECTIOUS OPHTHALMIA ("PINK EYE").—The disease is readily transmitted in sheep by contact or by instilling tears from an infected eye into the conjunctival sac of a normal eye. Filtrates of tears were not infective. An organism, resembling a rickettsia, and conforming to the description of *R. conjunctivae* was regularly present. The disease could not be transmitted to goats, dogs, mice, g. pigs, or rabbits.

MYXOMATOSIS.—The virus was successfully transmitted by the rabbit stickfast flea, *Echidnophaga myrmecobii*, and various mosquitoes.

Diseases, General

FOOT ROT AND FOOT ABSCESS.—These two sheep diseases have been clearly distinguished. Foot rot is a contagious disease. It has been eradicated from several properties, one running 30,000 sheep, by culling and isolation of "carriers" during the hot, dry months. Foot abscess is non-contagious and is troublesome mainly in abnormally wet seasons.

Sheep Parasites

HELMINTHS.—Studies on gastro-intestinal helminths of sheep were carried out in the field on the Northern Tablelands of New South Wales, a region which has a predominantly summer rainfall. Observations show that infestations with *Haemonchus contortus* are acquired from early spring to autumn and that outbreaks are closely related to rainfall. *Trichostrongylus* spp., on the other hand, are acquired during cooler weather and the heaviest infestations are seen in the late winter. *Oesophagostomum columbianum* larvae are picked up from pastures during the warmer months but, owing to their slow development in the sheep, maximum numbers of adult worms are seen in the winter months. The relationships between epidemiological findings and the control of the helminths in question are briefly discussed.

Sheep grazed continuously at one sheep per acre on natural pastures showed higher nematode egg counts and made smaller weight gains than similar sheep grazed rotationally. The latter sheep, at two per acre, were rotated through two paddocks, being moved once every three weeks. Over the whole area the stocking was the same as that for the continuously grazed group, *i.e.* one sheep per acre.

Sheep run at 4–5 per acre for two years on improved pastures showed very light degrees of infestation with gastro-intestinal helminths when a four-plot rotation was practised. Although the degree of infestation was low throughout the trial, the group which received regular anthelmintic treatment showed significantly greater weight gains and wool production.

ANTHELMINTICS.—Studies include observations already published on phenothiazine and related compounds [see *V. B.* **11.** 720]; on the comparative efficiency of phenothiazine, tetrachlorethylene, and copper sulphate and nicotine sulphate mixture in trichostrongylosis [see *V. B.* **11.** 720]; on the efficiency of copper sulphate and nicotine sulphate mixture and carbon tetrachloride against *Haemonchus* in adult sheep [see *V. B.* **10.** 875], and on lentin against *Oesophagostomum columbianum* [see *V. B.* **11.** 722].

BLOWFLY.—Studies on repellents showed that citronella and a fly spray containing "butyl mesityl oxide oxalate" prevented oviposition by *Lucilia cuprina* on attractive areas of the sheep. Physiological studies included observations on excretion of ammonia by *L. cuprina* maggots, on proteolytic enzymes in the gut of maggots, and on their absorption, accumulation, and elimination of copper, iron, and barium.

Toxicity studies showed that, of a series of dyes, methylene blue was most toxic and that several compounds of the triphenylmethane class came next. Arsenites were more toxic than arsenates. In dressings, no drug has proved as useful as boric acid. Effective maggot poisons, *e.g.* chloracetamide and nicotine, are toxic to the sheep. Arsenicals produce severe local poisoning. "B.T.B." mixture [see LENNOX—*V. B.* **12.** 613.] containing 30% boric acid with bentonite, tar oil, and a wetting agent was found very effective. Solutions of sodium pentaborate showed some promise.

SHEEP KED.—The results of studies on *Melophagus ovinus* have been published elsewhere [see *V. B.* **12.** 593].

Nutritional and Metabolic Disorders

BOVINE HAEMATURIA.—Field trials showed that top-dressing with gypsum delayed the onset of the disease, but did not prevent it entirely. Investigations on the possible association of trace elements with the disease were continued. Pastures from some affected areas showed a high molybdenum content and cows on these areas showed an abnormally high molybdenum storage in the liver. Application of gypsum to the soil markedly decreased the uptake of molybdenum by the pastures.

"PREGNANCY DISEASE".—Differential diagnosis between "LAMBING SICKNESS" (HYPOCALCAEMIA) and "pregnancy disease" is difficult. A more extensive use of calcium borogluconate in the field would result in saving many cases of hypocalcaemia now confused with "pregnancy disease".

"PEG-LEG."—Cattle receiving monoammonium phosphate in the drinking water showed a lower incidence of "PEG-LEG", bone chewing, and losses than controls.

ATAXIA.—Some ewes transferred from normal country to Cu-deficient areas may retain sufficient Cu for one normal lambing, although the Cu concentration in their blood may be reduced to very low levels. Ataxia, though usually seen in the lamb, has been seen in a four-year-old sheep which had shown Cu deficiency symptoms for two years previously.

COPPER DEFICIENCY and COPPER METABOLISM OF SHEEP.—Sheep grazing on calcareous, Cu-deficient soils, may ingest licks which contain sufficient Cu to provide an average consumption of 100 mg. of Cu per day for at least 18 months without apparent harmful effect and without storing unduly high amounts in their tissues. This is contrary to experience with sheep fed under different conditions with similar quantities of Cu. Merino sheep appear to be particularly prone to the effects of Cu deficiency in the pasture and will develop untoward symptoms and die under conditions which are withstood by cross-bred sheep for a much longer period.

COBALT DEFICIENCY IN SHEEP.—The administration of 0·1 mg. Co per day to sheep on Co-deficient pastures maintains them in perfect health and productivity. Chemical studies have shown that the amount of Co ingested from normal pastures is extraordinarily small and that the quantity retained by the tissues of normal animals is minute. Co injected intravenously is rapidly excreted in urine and faeces and is ineffective in curing Co-deficient sheep.

PHOSPHORUS METABOLISM OF SHEEP.—Further field trials on soils deficient in phosphorus showed that the provision of phosphatic supplements had no beneficial effects on sheep and that the widespread use of phosphatic licks is uneconomic and not justified by experimental observations.

INFLUENCE OF NUTRITION ON WOOL PRODUCTION.—Preliminary studies suggested that the adequacy or inadequacy of the diet during development influences to a very considerable degree the subsequent efficiency of the sheep as a converter of matter and energy. Changes in conformation and striking alterations of wool type were shown between groups on high and low planes of nutrition.

Physiology

FERTILITY IN SHEEP.—The periodicity of oestrus has been further studied in groups of sheep of different breeds comprising Camden Park merinos (direct descendants of the original flock bred by Macarthur), Border Leicesters, half-bred Border Leicester × Camden Park ewes, Dorset Horn and Austin-Wanganella merinos. All showed the periodicity previously observed. The breeding season of the Border Leicester was the shortest; that of the Border Leicester × Camden Park merinos cross was longer than that of the Border Leicesters, but shorter than that of the Camden Park merinos.

Observations on merino sheep at widely separated points, *viz*, north Queensland, south-western Queensland, central coast New South Wales, and Tasmania, showed, with the exception of north Queensland, similar periodicity of oestrus.

DEGLUTITION IN SHEEP.—A summary of results has been published elsewhere [see *V. B.* **12.** 239 and 352].

ABSORPTION AND EXCRETION STUDIES.—Lignin, which is totally undigested by sheep, was used for the study of absorption and excretion within the intestinal tract. Sodium salts, which are added in considerable amount to the rumen contents through the constant flow of saliva, and to the duodenal contents through the pancreatic secretions, are absorbed mainly in the caecum. Calcium salts are absorbed in the ileum, excreted to a great extent in the caecum, and voided in the faeces.

Poisoning

CARBON TETRACHLORIDE.—A commonly accepted view has been that a lime deficiency will render sheep more susceptible to carbon tetrachloride poisoning. Sheep were rendered hypocalcaemic by maintenance on a Ca-deficient diet. When drenched with CCl_4 these sheep did not show the toxic effects typical of poisoning by this drug and there were no deaths. Administrations of CCl_4, however, sometimes produced a temporary hypocalcaemia in sheep on a diet containing adequate Ca, and aggravated the hypocalcaemia in sheep on the Ca-deficient diet. Hypocalcaemia was not accompanied by unusual symptoms unless the sheep were exercised. The evidence suggests that some of the sheep losses in the field associated with CCl_4 drenching may be the result of hypocalcaemia induced by CCl_4 or aggravation of pre-existing hypocalcaemia.

Miscellaneous Investigations

The following are briefly reported. Immunological

studies on HAEMONCHOSIS, nematodes affecting army horses, pathogenicity of *Nematodirus* spp. in sheep, recovery of nematode larvae from soils and pasture, survival of eggs and larvae of sheep nematodes in faeces exposed to atmospheric conditions in the field, BALANITIS in wethers and rams, biochemical studies on vitamin B_1 in relation to PREGNANCY TOXAEMIA of sheep, chemical and physical studies on wool (wool wax, isolation of cholesterol, potassium content of scouring liquors, unshrinkability), wool biology, genetics (inheritance of colour in sheep, inheritance of "WRINKLING" in merinos and cross-bred sheep, establishment of an inbred flock of Australian merinos, inheritance of horns in sheep, Zebu hybridization, nutrition (digestion of cellulose, drought feeding, "coast disease"), BLOWFLY "STRIKE" (blue treatment of breech, Manchester's treatment, effect of tail length on susceptibility to strike, breech conformation of sheep and strike incidence, shearing of lambs).—H. McL. GORDON.

AUSTRALIA, SOUTH AUSTRALIA. (1939). **Report of Stock and Brands Department [1938-39].** [LOXTON, C. A.]—*Rep. Minist. Agric. S. Aust. 1938–39.* pp. 45–48.

The year was a very good one for animal health. No case of BOVINE CONTAGIOUS PLEURO-PNEUMONIA was observed. The tuberculin testing of cattle herds progressed, the number of TUBERCULOSIS-free herds rising to 59. The stickfast flea (*Echnidnophaga gallinaceae*), which is a parasite on poultry, dogs, cats, and rodents, continued to cause trouble in a few localities.

Census figures are given for horses, cattle, sheep, and swine, and also abattoir returns. 3,040 cases of TUBERCULOSIS and 427 cases of ACTINOMYCOSIS were found in 202,000 slaughter cattle.—J. E.

AUSTRALIA, NEW SOUTH WALES. (1941). **Live Stock Diseases Report—1939/40.** [HENRY, M.] pp. 4. [fcp] [Mimeographed].

This is a wartime substitute for the usual detailed report and contains only a few details of work done.

There were 37 outbreaks of ANTHRAX, mostly in sheep flocks, and 292,000 sheep and 3,453 cattle were vaccinated. Some 5,000 tuberculin tests were carried out on cattle and 60 reactors were found. There were 34 outbreaks of BLACKLEG reported, but more are believed to have occurred. Only one outbreak of BOVINE CONTAGIOUS PLEURO-PNEUMONIA occurred, involving 100 deaths. A few other diseases are referred to.

About half a million swine were slaughtered and TUBERCULOSIS was found in 6,000.

The livestock census in March, 1939, was 2,812,000 cattle, 548,355 horses, 48,877,000 sheep, and 377,000 pigs.—J. E.

GOLD COAST COLONY. (1941). **Report on the Department of Animal Health for the Year 1940-41.** [STEWART, J. L.] pp. 6. Accra: Govt. Printer. [fcp] [1s.]

There was a sustained call on the Colony to supply meat, partly for military organizations, and the demand was fairly well met, due to past work by the department to grade up native cattle.

TRYPANOSOMIASIS was rare, but ANAPLASMOSIS was prevalent. PIROPLASMOSIS due to *Babesia major* appeared in an immunization camp and was stopped by "Pirevan" therapy. RINDERPEST immunization work was continued. An outbreak of BOVINE CONTAGIOUS PLEURO-PNEUMONIA occurred, a potent virus being isolated; this virus was found useful for the titratation of vaccine; over 200,000 cattle were vaccinated with culture virus.

The laboratory at Pong Tamale produced 40,000 doses of RINDERPEST serum and vaccine, over 200,000 doses of BOVINE CONTAGIOUS PLEURO-PNEUMONIA vaccine, and a great deal of FOWL CHOLERA antiserum. Three cases of congenital *Anaplasma centrale* infection in calves were observed.

The progress of tsetse eradication by river bank bush clearing reached an extensive stage.

Work on livestock improvement is described.—J. E.

U.S.A. (1941). **Report of the Montana Livestock Sanitary Board, December 1, 1940 to November 30, 1941.** [BUTLER, W. J.] pp. 28. Helena, Montana. [4to] [Mimeographed].

This report gives a very good account of livestock diseases and veterinary food inspection in Montana. The year was very favourable for animal husbandry and there were no serious disease outbreaks. The percentage of BOVINE TUBERCULOSIS was only 0·05 and that of BRUCELLOSIS 3·5; calfhood vaccination against the latter disease is favourably reported upon. There were 279 cases of EQUINE ENCEPHALOMYELITIS. SWINE FEVER and ERYSIPELAS were rare, and there have been no cases of RABIES in the state since 1925.—J. E.

U.S.A. (1941). **Report of the New York State Veterinary College at Cornell University for the Year 1939-1940.** [HAGAN, W. A.] pp. 226. Geneva: W. F. Humphrey Press Inc. [8vo].

Details are given of the staff and curriculum. Since 1934 the annual number of new students admitted has been limited to 40; the number applying for admission was 389 in 1940.

Statistical reports are given of the work of the college clinics and diagnostic laboratories and publications in the veterinary press by members of the college are reprinted in the report.

An outline of research done by members of the teaching staff is given, covering brucellosis, mastitis, canine leptospirosis, canine encephalomyelitis, parasitic diseases, poultry tumours and physiological problems. —J. E.

CHINA. (1939). **The National Agricultural Research Bureau, Ministry of Economic Affairs. Report for the Year 1938.** pp. 21. Items of veterinary interest pp. 17–19. Chungking: Ministry of Economic Affairs. [8vo].

After a resumé of the history of the National Agricultural Research Bureau of China, the work of its three departments is described. That of the Animal Husbandry Department includes the control of disease in livestock.

RINDERPEST broke out in Szechwan, Kweichow and Hupeh and Bureau officials went to organize its control. Some hundreds of cattle were treated with antiserum and a smaller number was vaccinated, products of Chinese origin being used.—J. E.

BOOK REVIEWS

MCCLUNG, L. S. [Indiana University], & MCCOY, E. [University of Wisconsin]. (1941). **The Anaerobic Bacteria and their Activities in Nature and Disease. A Subject Bibliography. Supplement One. Literature for 1938 and 1939.** pp. xxii + 244. Berkeley & Los Angeles: University of California Press. [4to].

This is the first supplement to appear of the authors' great bibliography of the anaerobes covering the literature up to 1937. It gives the references of 1938, 1939, and part of 1940. It is set out according to the original plan, having an alphabetical author index for the two whole and one part year covered, followed by the

subject bibliography, materially improved this time by the insertion of titles of articles and guiding footnotes as well as author and source references. This improvement removes the chief source of criticism mentioned in our review of the original work [see *V. B.* **9.** 513]. It is also pleasant to note that the survey of the veterinary literature has been adequately extended: some references have been taken from *Index Veterinarius* and the *Veterinary Bulletin.*

Veterinary workers can rely confidently on this supplement for the literature on the anaerobes and anaerobic diseases of animals.—J. E.

KRACKE, R. R. [M.D., Professor of Bacteriology, Pathology and Laboratory Diagnosis, Emory University School of Medicine]. (1941). **Diseases of the Blood and Atlas of Hematology. With Clinical and Hematologic Descriptions of the Blood Diseases Including a Section on Technic and Terminology.** pp. xxiv + 692. 46 figs., 54 plates. Philadelphia, London, Montreal: J. B. Lippincott Company. [2nd Edit.] [4to] [£4 10s.]

Medical literature is well supplied with up-to-date text books of haematology, but nevertheless this second edition of Kracke's "Diseases of the Blood" is a notable addition to their number. The book is divided into eight sections; the first section contains a discussion on terminology and definitions of haematological terms; the second section exhaustively treats the controversial subject of the development of the blood cells, giving due weight to the presentation of the monophyletic and polyphyletic schools of thought; this section also contains adequate morphological and physiological descriptions of the various blood elements. Section three is entitled "Leukocytosis and Leukopenia" and contains a chapter on the leucopenic diseases. Section four is devoted to the anaemias, including a new chapter on haemoglobin and its derivatives and the porphyrin compounds. The next section is entirely on the leucaemias with a valuable chapter on their treatment by CARVER. Haemorrhagic diseases are extensively dealt with in section six, and a very useful chapter on vitamin K is included. Section seven is entitled "Miscellaneous"; it has a very complete account of the bone marrow in health and disease with details of the various methods by which it may be studied. A chapter on the "Blood Picture of Normal Laboratory Animals" concludes this section. The eighth section is devoted entirely to haematologic technique. This is a very comprehensive part of the work, methods are described in detail and few procedures are omitted.

The book supplies all the basic and fundamental facts of haematology, whether medical or veterinary although, of course veterinary applications as such are not dealt with. The section on technique is invaluable and this in itself would justify it for all those engaged in practical haematology.

In the reviewer's opinion, it is one of the best works that have been published on the subject for some time.
—D. L. HUGHES.

WRIGHT, J. G. [F.R.C.V.S., Professor of Veterinary Surgery, University of Liverpool; Formerly Professor of Surgery, Royal Veterinary College, London]. (1942). **Veterinary Anaesthesia.** pp. vii + 207. 54 figs., 1 appendix. London: Baillière, Tindall & Cox. [8vo] [10s. 6d.]

The author's object has been to incorporate in a small volume the present status of knowledge on anaesthesia in the domestic animals, particularly for veterinary students. The first few chapters deal with local and regional anaesthesia, followed by chapters on basal narcosis, general anaesthesia by volatile substances, and anaesthesia by non-volatile substances.

The user will find sound and detailed instruction on many methods of inducing anaesthesia in domestic mammals: the book is not, however, an exhaustive treatise on the subject as some serviceable methods are not mentioned, *e.g.* chloral hydrate intraperitoneally, or nitrous oxide in inhalation anaesthesia.

The arrangement of the material and the choice of chapter headings is irritating to the orderly minded reader. A complete survey of the field of anaesthesia in the opening chapter would have been a great help as well as a guide to particular methods and parts of the book. One would expect to find information on chloral hydrate all in one part of the book, yet, while its use in the horse is described under "narcosis", chapters xii and xiii (why not all in one chapter ?), its use in the pig is not mentioned in the scrappy section concluding chapter xiii, but is described in chapter xxii under "non-volatile anaesthetics".

The references are not given in a standardized form, which is unusual.

The author rightly denounces the obsolete Animals (Anaesthetics) Act of 1919, and describes some methods which anticipate its revision.

The word "anaesthetics" is mis-spelt on the binding cover of the book.—J. E.

WILSON, G. S. [M.D., F.R.C.P., D.P.H., Professor of Bacteriology as Applied to Hygiene, University of London, London School of Hygiene and Tropical Medicine]. (1942). **The Pasteurization of Milk.** pp. xii + 212. 44 tables, 1 appendix. London: Edward Arnold & Co. [8vo] [18s.]

A strong case for the compulsory pasteurization of the milk supply is presented, supported by statistics and other data from reliable sources.

"Cows' milk constitutes one of the most important articles of our dietary. It is also one of the most dangerous. This statement is no exaggeration, and abundant evidence will be brought in the following pages to justify it. Put quite briefly, udder disease of different types is so prevalent among cattle in this country that the milk as it comes from the cow is frequently infected with pathogenic bacteria. In addition the milk is occasionally exposed to infection from the human personnel engaged in handling it, as well as to contaminated water used in washing the utensils. Some of the pathogenic micro-organisms that gain access to it, particularly those responsible for the enteric group of diseases, are capable of multiplying rapidly in the milk which, unlike most of our common foodstuffs, is an excellent medium for the growth of bacteria. It is not therefore surprising that, exposed as it is to infection with so many different micro-organisms coming from such a variety of sources, milk should frequently be responsible for disease in those consuming it in the raw condition."

"Not until municipal authorities exercise the same care over the milk supply as they do over the water supply, and not until the public is educated that milk is an article of their dietary which has to be treated with special caution, will it be justifiable on hygienic grounds to recommend the unlimited consumption of cows' milk."

Diseases of cattle which are likely to render the milk unsafe are briefly reviewed.

Most medical men, in advocating pasteurization, are inclined to base their case on the danger of pathogenic bacteria derived from the cow and to minimize the risk of infection from other sources. Infection from human, water and rodent sources is, however, given prominence in this work. Pasteurization presents an easy way of preventing infection from milk whether from human, animal, or other extraneous sources.

The methods used for official and unofficial pasteurization are briefly discussed, together with the various tests employed in checking its efficiency.

It is unfortunate that the need for improvement in the production of milk has not been sufficiently emphasized and one is left with the impression that, provided the milk supply is made "safe", this is all that can be hoped for.—H. E. BYWATER.

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ERRATA.

Vol. **8.** p. 115. LEIPER, J. W. G. (1937). for "An application of unoiled calcium cyanide", read "An application of uncoiled calcium cyanamide".

Vol. **9.** p. 151. for "MEWSON, I. E., & THORP, F., Jr. (1938)", read "NEWSOM, I. E., & THORP, F., Jr."

Vol. **11.** p. 559. for "II. GORDON, H. McL. (1939)", read "II. GORDON, H. McL., & WHITTEN, L. K. (1939)".

Vol. **12.** p. R6. for "MACLEOD, C. M., MIRICK, G. S., & CURREN, E. C. (1940)", read "MACLEOD, C. M., MIRICK, G. S., & CURNEN, E. C. (1940)".

p. 105. BROWN, G. L., & HARVEY, A. M. (1939). for "[. . . readers should see *V. B.* **10.** 277 – – –.]", read "[. . . readers should see *V. B.* **10.** 276 – – –.]".

p. 262. I. GRIFFITH, A. S. (1941). for "[. . . BROOKE—*V. B.* **9.** 200]", read "[. . . BROOKE—*V. B.* **12.** 200]".

p. 341. for "HEIDELBERGER, M., WEIL, A. J., & RREFFERS, H. P. (1941). . . . **II. The Interrelation of Component with Antigen-Antibody Compounds . . .**", read "HEIDELBERGER, M., WEIL, A. J., & TREFFERS, H. P. (1941). . . . **II. The Interrelation of Complement with Antigen-Antibody Compounds . . .**".

p. 385. BOEV, S. N., & VOL'F, Z. V. (1938). for "[*Protostrongylus* (*Synthetocaulus schulzi*) **n. sp. . . .**]", read "[*Protostrongylus* (*Synthetocaulus*) *schulzi* **n.sp. . . .**]".

p. 387. for "HOGAN, A. G., MUHREN, M. E., & BOGART, R. (1941)", read "HOGAN, A. G., MUHRER, M. E., & BOGART, R. (1941)".

p. 430. McCARTY, M., & TILLETT, W. S. (1941). for "**. . . Effect of Sulphapyridine on the Leukocytic Action of Benzene**", read "**. . . Effect of Sulphapyridine on the Leukotoxic Action of Benzene**".

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p. 462. for "WORKANY, J., & NELSON, R. C. (1942)", read "WARKANY, J., & NELSON, R. C. (1942)".

p. 564. **Extracts from Annual Reports – – –.** for "NEW YORK, 1940", read "CORNELL UNIVERSITY, N.Y., 1940".

p. 615. —. (1942). **Report of the Committee* on Communicable Diseases Affecting Man.** add *** [of the International Association of Milk Dealers].**

p. 626. INDIA. for "ADDITIONAL NOTES (See also Table II)", read "ADDITIONAL NOTES (see also Table III)".

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